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THE FUTURE POSITION OF SMALL AND MEDIUM SIZED PORTS IN EUROPE AND A FRAMEWORK FOR RE-ENGINEERING THEIR BASIC PROCESSES

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Abstract

This paper is based on the work that the authors are doing as project manager and deputy project manager correspondingly of the SPHERE project (DGVII Transport Research Programme). At first, a concise picture of the current situation and future prospects for the small and medium sized ports in Europe is given. This is based on a comprehensive survey of 56 ports and 83 port users from 13 European countries, conducted during the course of the project. Then the paper discusses the methodology of re-engineering current port processes and introduces the Value System concept which is suggested as the most suitable for fulfilling the identified requirements of the port system.

INTRODUCTION

Objective

This paper aims at presenting the views of port users, actors and authorities regarding the future position and competitiveness of small and medium ports in the EU. Furthermore, it suggests a generic framework for re-engineering the main operational processes of such ports in order to achieve radical improvement of their competitiveness. It is based on the research undertaken within the framework of the 3-year project **SPHERE** (**S**mall/medium sized **P**orts with **H**armonised, **E**ffective **RE**-engineered Processes).

CURRENT POSITIONING AND FUTURE PROSPECTS OF SMPs

In order to proceed with the re-engineering of SMP processes and be able to evaluate its results, it is important to obtain a clear picture of the current situation, i.e. to identify their strengths and weaknesses and beyond that, the role they currently play in the overall transportation networks. Two major surveys were conducted during the first year of the project. One among users of small/medium sized ports and one among authorities of such ports.

Highlights from the surveys' results

The survey questionnaires included a large number of questions regarding:

- the users' satisfaction from the SMPs they use
- the identification of the users' requirements
- the mechanisms by which, SMP Customers choose the ports they use
- the identification of problems and bottlenecks
- the users' perceptions with regard to the future positioning and survival of SMPs

The quantitative and qualitative analysis of the responses is presented in detail in the first SPHERE deliverable (SPHERE Consortium, 1997). The most significant results have been selected and are presented in this section.

Both the customers and actors of SMPs believe that the points where the most significant bottlenecks (see also Fig. 1) occur are at:

- the terminal gate, mainly due to information/communication problems and cumbersome bureaucratic procedures during gate processing;
- the link with the Trans-European Networks (TEN) or the land transportation networks in general, due to either lack or inadequacy of infrastructure or network-related factors.

SMP customers have pointed out "Flexibility" and "Organisation and management" as the two parameters primarily requiring radical change. As regards information/communication, the vast majority of the users (about 85%) currently communicate with SMPs using conventional means. Most of them however, expect to shift to EDI or simple electronic mail in five years. Remarkable was the high percentage of users (about 70%) which often prefer personal contact for their communication with the port or their customers. Despite the expected significant increase of users

using electronic communication means (40% increase), the expected reduction in personal contact was relatively small (about 20%). This is due to the users' acknowledgement that in smaller ports, it is the personal contact that ensures flexibility to a large extent.

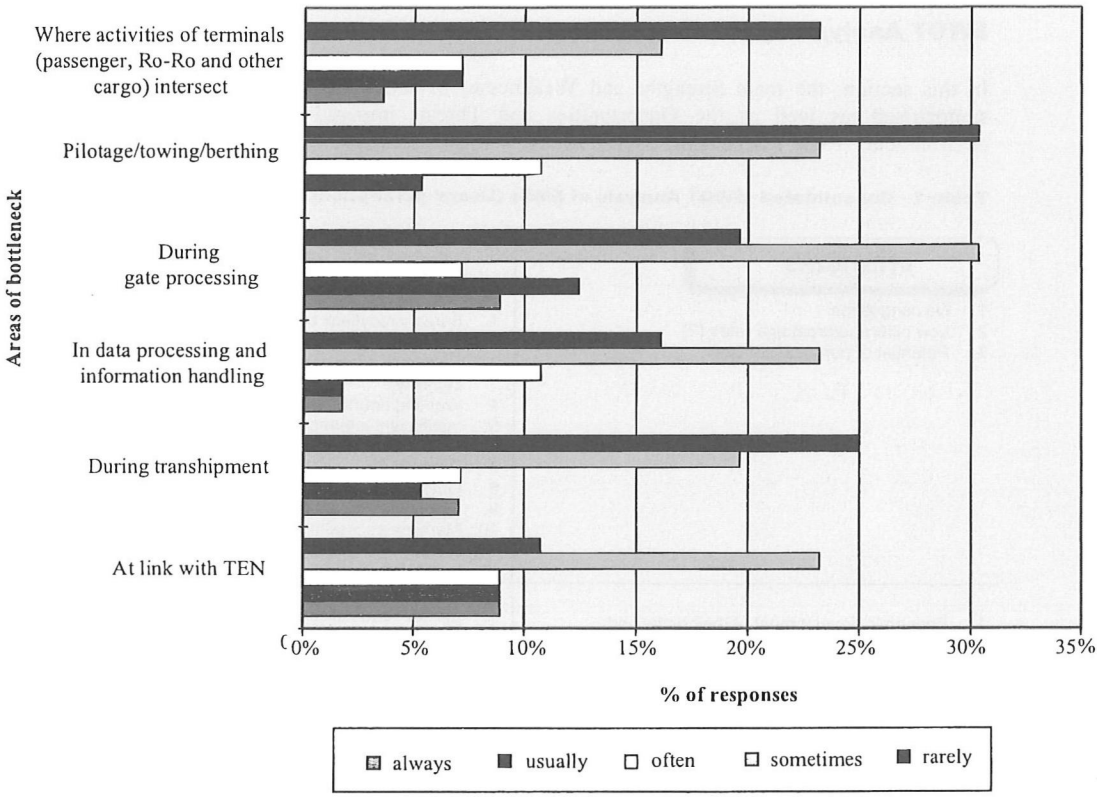


Fig. 1: Areas where major bottlenecks/problems occur (by frequency - all respondents)

- Both actors and customers have emphasised the need for improved communication between them and between them and the port authorities (especially as regards the electronic exchange of documents and the prompt and reliable information on vessels' Expected Time of Arrival). Both categories of respondents tend to believe that information /communication-related problems are due to "incomplete information", followed closely by "poor organisation of port personnel".

The port Customers indicated "value for money" as the primary factor for choosing a port. Value for money is strongly related with specific services/facilities provided and time savings achieved. These depend to a large extent on port flexibility which is a function mainly of personnel mentality, customer-oriented management and effective use and handling of information. Finally, personnel mentality and management policy are very much related with the prevailing institutional framework. Bearing in mind that most of these factors have been pointed out as problematic, the competitive position of SMPs can not be characterised as particularly favourable.

This was also verified by the responses obtained in the question regarding the reasons Customers co-operate with the SMPs they work with. Main reason for using a specific SMP its geographic convenience (43%) by far from other parameters denoting "value for money" such as the provision of specialised services and price/tariffs (11%).

SWOT Analysis

In this section, the main Strengths and Weaknesses of SMPs (as perceived by their users) are summarised, as well as the Opportunities and Threats imposed on them by their business environment. Table 1 depicts the SWOT Analysis in a consolidated form.

Table 1 - Consolidated SWOT Analysis of SMPs (Users' perception)

STRENGTHS	WEAKNESSES
1. No congestion 2. Low pilferage/breakage rates (?) 3. Potential of personal contact	1. Bureaucracy/lack of flexibility 2. Outdated management 3. Links with other networks (+ shortages in network capacity) 4. Working hours 5. Insufficient intermodal services 6. Labour practices and mentality 7. Productivity 8. Outdated information systems 9. Equipment/superstructure shortcomings 10. Maritime accessibility 11. Pricing 12. Lack of promotion
OPPORTUNITIES	**THREATS**
1. Economic development of their hinterland 2. Specialisation 3. Potential of Information Technology developments	1. Limited funds allocated/available 2. "Lobbies " by larger ports 3. Institutional constraints

Main Strengths

1. In comparison to larger ports, SMPs are not congested.

2. Low breakage and pilferage rates. This is a point which both Customers and Actors agree upon.

3. Due to the limited dimensions of SMPs, personal contact is always much more developed than in larger ports. This fact creates a significant potential for enhanced flexibility and effective relationships between Customers and Actors. This potential may or may not be developed depending primarily on the institutional framework and the quality of SMP management.

Main Weaknesses

1. Excess bureaucracy is a characteristic of most ports but is much more intense in SMPs, probably because their ties to public ownership tend to be much stronger. It is more visible in administrative procedures and especially those related to the Customs. However, it results in

unnecessary delays, cumbersome procedures and inflexibility in all areas of SMP operation. This weakness is strongly related to "threat no 3" and "weakness no 7" below.

2. Outdated management: Port management, though highly competent in terms of technical know-how, still lacks basic knowledge of business administration and marketing. This is mostly obvious in publicly-owned ports. There are also cases where management know-how, experience and techniques are available but deactivated by the prevailing institutional framework or owner status. Pricing and promotion problems (W11 & 12 below) are much related to such shortcomings.
3. The links of many SMPs with other transport networks (especially road and rail) are not sufficient (if not non-existent). Moreover, in some cases the capacity or the quality of the land transportation networks of the hinterland are not appropriate for serving the traffic generated by the SMPs. Weaknesses of National Railway Organisations result in additional problems in some countries.
4. Limited working hours are a major cause of perceived low productivity of SMPs. Furthermore, overtime charged for operation beyond the first shift, results in high costs of using these ports.
5. Insufficient intermodal services: shortages in intermodal infrastructure and equipment, coupled by lack of the appropriate information/communication systems for supporting such an operation and by limited know-how on the part of SMP labour. Moreover, absence of services such as cargo consolidation and container stuffing/stripping.
6. Labour practices and mentality are considered to be counter-productive and are mainly attributed to the prevailing institutional framework and owner status.
7. Overall, SMP productivity is considered to be rather low, indicated by rather high turnaround and cargo handling times. This is strongly related to weaknesses 1,2,4,6,8 and 9, as well as to non-rational organisation of port operation. In some SMPs significant waiting time may result from ineffective organisation and co-ordination of the different entities involved
8. The information and communication systems of many SMPs are considered to be outdated. They do not support either the electronic data processing/information handling or the integration of information flows along the different areas of port operation. The quality of information produced by such systems is in many cases below the standards expected by the Customers and/or required for an effective port management.
9. Equipment-related problems regard primarily inadequate maintenance (resulting in often breakdowns) and lack of specific types of equipment, especially heavy lifts and specialised cargo handling equipment. In addition, superstructure shortcomings usually regarding special warehouses emerge in many SMPs.
10. Maritime accessibility in many cases is hampered by one or more of the following reasons:
    - outdated infrastructure, hampering the effective service of large container ships (quay layout and water depths impeding berthing and access);
    - inadequate navigation tools in cases of adverse weather or other special accessibility problems.
11. The SMP pricing system may form a weakness in many cases (see also 2.7.3.2) due to:
    - inability to allocate costs to the services which create them;
    - inflexible pricing
    - lack of freedom to establish incentives for specific categories of port users, etc.
12. Lack of promotion leading to false and inaccurate impression regarding the operation of SMPs.

Main Opportunities

Most of the SMP users who have commented on the survival and positioning of SMPs have stressed their strong ties with and dependency on the industry/trade developed within their hinterland. This is strongly related to their belief that the future of SMPs lies on specialisation in specific cargoes or vessel types.

Therefore, the opportunities that may exist for the development of SMPs are very much dependent on the economic development of their hinterland, the generation of sufficient cargo flows of interest and the possibility of focusing on the specific types of cargo.

In this framework, the existence of competent and long-sighted managers and the adoption of contemporary management mentality is decisive (see also weakness no 2 above).

On the other hand, sophisticated information/communication systems are much more accessible nowadays. Their sound application encompasses a significant potential for SMPs, regarding spectacular increase of productivity and flexibility.

Main Threats

1. SMPs in comparison to larger ports, usually have limited resources available for their modernisation. This may become more intense (and perpetuated) when national funds are allocated to various ports according to their size.
2. Due to the limited size of their operation, SMPs usually have low bargaining power. Moreover, in some cases, they have to "fight" for their interests against mighty, established lobbies formed by larger ports.
3. Finally, in many cases, a serious threat to SMP survival and development may be the institutional framework .

Critical Aspects of SMP Competitiveness

Port "Efficiency"

Although the statistical analysis of the survey results indicates that most of the SMP customers consider port efficiency as the most significant factor in terms of port competitiveness, most of the discussions held during the interviews revealed that "efficiency" is to a significant extent meant as "flexibility". Rapid reaction, especially in periods of peak demand is considered to be a primary reason for choosing a port to work with. SMPs due to their dimensions and very much developed personal contact, can be more flexible (unless institutional obstacles block this potential out). Efficiency is also strongly related to the ports' congestion and the amount of space they can provide. This can be another reason for preferring an SMP to a larger port.
However, efficiency is directly dependent on several factors which still tend to be quite weak in SMPs. These are:

- availability of the appropriate and well-maintained equipment, infrastructure and superstructure;
- availability of the appropriate infrastructure linking the port with other transportation systems and most notably with the road and railway (national and international) network of the hinterland. Most of the respondents have realised the significance and potential of intermodal transport. Moreover, they would expect a port to function as an intermodal interchange;

- provision of a widest range of services possible, especially regarding intermodal operation. Almost all the respondents (at least those handling container traffic) have pointed out cargo consolidation and container stuffing/stripping as the most significant, and therefore necessary, services offered. On the other hand, many SMP non-users have indicated that they would not use an SMP for reasons of inability to handle container traffic efficiently;
- professionalism and practices of the port human resources, which affect the turnaround time and the working hours. Constraints of an institutional nature are also very significant here.

Finally, it must also be borne in mind, that "efficiency" (i.e. "doing things right" according to P. Drucker) is often confused and used interchangeably with the term "effectiveness" ("doing the right things" according to Drucker). In this sense, offering efficient services, facilities, equipment and personnel may be useless if these are not tackling the major service elements customers require. In other words, market-orientation, i.e. awareness of the market possibilities and requirements, is paramount to successful, competitive operation.

Pricing

Efficiency is usually related to the prices charged by SMPs. Most of the respondents have agreed that usually prices are high, not in absolute terms, but compared to the "product" offered by SMPs. Cost-effectiveness is a decisive factor for choosing (or abandoning) a port but usually it cannot be the most significant. Apart from the service offered, there are always reasons related to geographical location and market available (both in terms of available cargo flows, as well as of shipping lines calling) playing the primary role.

The Institutional Framework

The institutional framework has mainly been discussed with customers of publicly owned SMPs. They all agree that purely public ownership fosters bureaucracy and anti-competitive mentality of the port personnel, which affect all the factors mentioned so far as being of utmost importance in port competitiveness. Seven out of the twelve weaknesses mentioned in section 2.3.2 are directly related to institutional aspects or constraints (see weaknesses 1,2.4,6,7,11 and 12). The outdated management, ineffective pricing and limited working hours are the most important ones because they greatly affect the others as well.

Lengthy bureaucratic procedures and unnecessary state intervention prevents management from streamlining operation and reacting quickly to market needs. On the other hand, governmental protection to some ports "insulates" them from the negative reactions of a market that is not being properly served. As a result, remedial action, which could render the port more competitive, is not taken immediately. Therefore, it must be stressed that often *the port's institutional structure is the cause of many symptoms of port malfunction, as it separates the port from its clients and its market.*

A FRAMEWORK FOR RE-ENGINEERING PORT PROCESSES

The necessity of process orientation

A process is a series of related activities that together create value for a customer (Hammer & Stanton, 1995). Usually, the individual tasks forming a process are of the slightest interest or value

to the customer. What the customer is concerned with is the end result - the end product, or service - created by the sum total of these related activities.

Processes by definition are cross-functional and results oriented (Hammer & Champy, 1993). For this reason, in traditional organisations, processes are usually fragmented, i.e. parts of them are under the responsibility of different organisational departments or units. Therefore, the process, as a whole ending up to the customer, remains invisible and essentially unmanaged. This fragmentation is the main source of interruption between the different steps of the process (hand-offs, data re-keying and redundancy etc.), leading to significant waste. This is even more evident in port processes where different entities are involved and not simply different departments of the same organisation.

Still, processes form the mechanisms through which, SMPs deliver value to their customers. Therefore, the shift of perspective from task- to process-orientation is a major first step towards reaping the dramatic improvements achieved through re-engineering.

Re-engineering a process means redesigning it from scratch to achieve dramatic improvements in critical measures of performance such as cost, quality, service and speed (Hammer & Champy, 1993). In essence, re-engineering involves understanding what a process is really about, and accordingly identifying the "value" within it and cutting out the rest (Ballé, 1995). The "value" is defined according to the identified principal target of the process and the requirements of its customers.

The steps of port process re-engineering

Within SPHERE, the port process re-engineering was realised in the following steps:

1. The general positioning of SMPs and their users' requirements were identified through the SPHERE surveys;
2. The processes to be re-engineered were selected;
3. The selected processes were understood in depth using Discontinuous Thinking Analysis (DTA);
4. The conclusions of the SPHERE surveys and the DTA were matched in order for re-engineered processes to be structured meeting SMP users' requirements. This match led to the introduction of the Value System concept as the most suitable to meet the highlighted requirements;
5. Generic re-engineered solutions were produced and grouped in order to be systematically presented. The solutions were based on the Value System concept and the adoption of modern information/communication technology.

Step (1) has already been presented in section 2, whereas the other four methodological steps are presented in more detail in the following sections.

Selection of processes to be re-engineered

The identified processes of the four ports-members of the SPHERE Consortium formed the backbone of these generic processes, which was enriched and amended according to the experience gained from the first deliverable of the project, the bibliography and other research (Branch, 1986; Branch, 1994; Downs 1992; ISL, 1985; ISL, 1990; UNCTAD, 1985), as well as multiple brainstorming sessions within the Consortium and with external experts. Furtheron, the formulation of the generic processes took into account considerations stemming from the intended use of the processes, as well as the principle conclusions drawn during the identification of processes in the individual ports. Thus, it was decided to focus on:

a. port operational processes, resulting in the production of output required by the external port customer;
b. multimodal flows and bulk cargo flows which are very often handled by SMPs.

Six generic processes were selected, i.e. the import of Lo-Lo containers, Ro-Ro cargo and bulk cargo, as well as the respective export processes. Emphasis was mainly placed on:

a. The transfer of cargo to/from road vehicles
b. The transfer of cargo to/from rail
c. Ship arrival
d. Ship departure

Sub-processes (a) and (b) include transfer and handling within the terminal if necessary and are examined for all three types of cargo, whereas (c) and (d) are common for all types of cargo.

Discontinuous Thinking Analysis (DTA)

Processes are usually supposed to serve a specific target. Sometimes however, through the years, modifications and additions are realised in them in order to enable them to deal with many different complex situations and problems faced. Thus, processes may end up disorientated and inflexible. Re-engineering aims at delivering the maximum possible value to the Customer and eliminating waste. What is defined as "value" and "waste" depends to a large extent to the actual objective of the process. For this reason, it is very important to *establish what the process is about and what its intended output should be*, before attempting to pursue it.

Although it is very useful to know which steps of the process are not adding any value, *simply eliminating those steps is not enough (or is not possible in many instances) for achieving dramatic process improvement.* The processes must be seen from totally new perspectives, with much creativity and imagination. The Discontinuous Thinking Analysis (Hammer & Champy, 1993) is a technique for understanding the real purpose of a process and determine effective alternatives of fulfilling it. In the context of SPHERE it was applied as follows:

a. Using detailed process maps produced with specialised software (PROPLAN by GPS), the process of interest was understood (main steps, input, output, backstage activities, mechanisms of value and waste within it), and its real role and purpose was revealed.

b. The basic assumptions underlying each process were identified. As such, common beliefs are considered which form the basis for the process to be structured as it is currently and influence the way the process is fulfilled. A few of the identified assumptions underlying the process of importing Lo-Lo containers are listed below as an example:

   - The vessel's Expected Time of Arrival (ETA) is paramount for port operation
   - Berthing is necessary
   - A vessel cannot be discharged unless it is inward cleared
   - A stowage plan is necessary for discharging
   - Gate procedures are necessary
   - Cargo documents are necessary
   - Ship's agents are necessary

   These assumptions were discussed in the framework of the DTA. The discussion pointed out the real purpose of specific steps within the process and revealed activities and practices which may not be necessary any more because they do not contribute to the fulfilment of this purpose.

c. The identified assumptions were dismantled, i.e. the process was restructured supposing that the identified assumptions (one-by-one) are not valid. Thus, the impact was examined of modifying radically the form of the process.

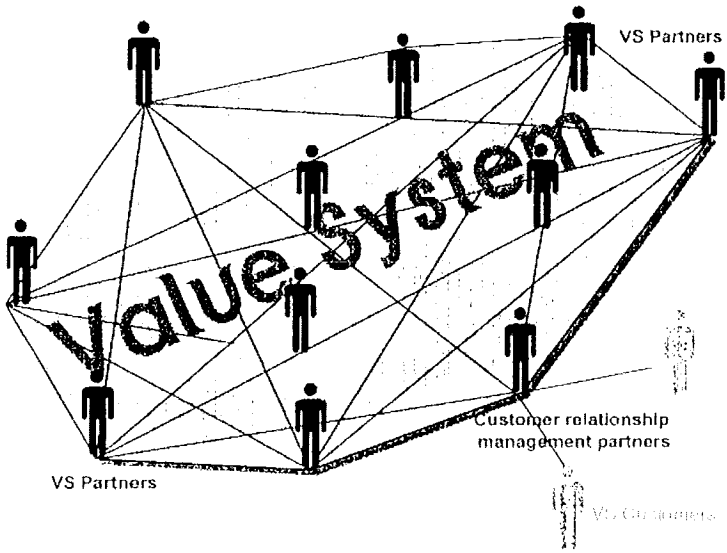
Apart from the individual conclusions regarding the dismantling of each identified assumption, some general conclusions were also drawn from the DTA as a whole. These are:

- A significant number of entities (often of seemingly conflicting interests) interrelate within the framework of a port process. This phenomenon is in most cases responsible for the fragmentation of port processes (for each step, different entities are responsible, unwilling to truly collaborate with each other). Due to this excess fragmentation, it is very possible that the value delivered to the final customer of the port process may be only marginally increased, even if a port process is perfectly organised or supported by state-of-the-art technology.
- Very few steps of each process are really value-adding (i.e. in the context of SPHERE, contributing to the maintenance of smooth cargo flows). On the contrary there is significant "waste" built in the process elements in the form of paperwork, re-keying of the same data and iterations, controls and inspections etc.
- Much of the "waste" observed is due to lack of timely and dependable information. In many cases, the flow of information is slower and much more complicated than the flow of cargo. As a result, interruptions emerge, leading to ineffectiveness and inflexibility.
- Another significant "waste" generating factor is the revealed lack of integration between many of the process elements. This is mostly evident at the points of the process where the port boundaries are crossed, i.e. where port actors interact with port customers and/or the various Authorities involved in port operation.
- Port processes are characterised by a significant degree of complexity, especially as regards the exchange of information.
- Finally, it must be noted that in the case of SMPs, perceived limitations regarding the available resources, increase the challenge of pursuing and achieving maximum effectiveness.

Alternative scenarios for SMP operation and organisation

A Value System (VS) is a network of independent companies which focuses on creating value for the network's final customer. This is achieved through *flexible reconfiguration* of its participants' resources and competencies (TELE*flow* Consortium, 1996). Such a system can be visualised as a spider's web (fig. 2) which brings specific partners together as fast as possible in order for a specific problem to be solved, and then, disbands them equally easily.

- In the context of SPHERE, the port VS is mainly a logistics network formulated by a number of independent port actors or other actors within the supply chain e.g. cargo agents, ship agents, Customs etc. (nodes). These nodes are mainly small and medium enterprises, each one providing a specific capability that justifies its presence in the network. These will be activated according to the needs of the particular process to be fulfilled. Informal procedures are likely to be used in co-ordinating such a network, to achieve rapid response to customer needs and cost effective operation (since non-value-adding activities, especially double checks and controls, can be minimised) . The nodes form a network when they are interlinked. The cargo and information flows materialise these links.



Adapted from Quinn et al, 1996

Fig. 2: The Port Value System

According to the conclusions of the DTA and the basic ICT requirements for the viability of a VS, the different scenarios were formulated along the following main axes:

a. Accessibility by any VS partner of accurate, dependable and timely information.
b. Rationalisation and minimisation of information exchange (especially regarding ETA and arrangements with different actors).
c. Minimisation of controls / inspections and separation of such activities from value-adding ones.
d. Better utilisation of groups such as agents, pilots, tug boats by streamlining the cases where they are needed.
e. Process structures which accommodate the requirements of the majority. Individual cases must be treated individually (split of a process).
f. Effort to carry out activities in parallel rather than sequentially.

The overall aim was to minimise the generalised cost of passing through the port as a function of monetary cost, time and risk (Goss, 1990). This would be accomplished by minimising the "waste" built in the process by elimination of interruption, better utilisation of resources, quality procedures (to avoid any mistakes and output redundancy).

According to the results of the SPHERE surveys, SMP actors and customers have identified several areas which are very important for an SMP's smooth operation and competitiveness and which currently need to be improved. All of the factors to be improved, depend heavily on interventions in the organisational/informational framework. For this reason, the altemative scenarios produced are mainly focused on this area, although they take into consideration also the need for interventions regarding the SMP physical layout and legal/institutional environment. The main re-organisation aspect introduced is the adoption of the Value System perspective. The difference between the various scenarios lies on the variations of the suggested SMP Value System.

Theoretically, an infinite number of scenarios can be formulated by dismantling one by one (or combinations of) the assumptions underlying the process. These scenarios however, can be grouped and better identified if the main parameters characterising the port VS (and its transformations through re-engineering) are identified and given specific values (the selected parameters are qualitative and therefore, they cannot be assigned specific numerical values but can be distinguished on a high - low scale). Combinations of the specific values for each parameter indicate specific scenarios (Table 2). The selected parameters are:

- the organisational/informational status of the VS, which can be further broken down into:
  - * VS scope, expressing the type of entities included within the VS;
  - * VS Focus, expressing the main objective of the VS;
  - * Decentralisation of the VS structure and the related information;
- the required alteration of the physical layout and/or the equipment of the port;
- the extend up to which review of the legal/institutional environment is necessary in order to support each scenario.

CONCLUSIONS

According to their users, SMPs' future survival mainly lies on the exploitation of specialised niche-markets and on satellite operation to larger congested ports. The main parameter of their competitiveness is enhanced flexibility which can be achieved:

- under modern, customer-oriented management
- after amendments of the prevailing institutional framework
- through integrated data processing and information handling
- through personal contact

A significant number of interviews all over the EU has documented and substantiated these relatively 'common', long discussed statements.

Furthermore, this paper argues that critical problems and 'waste' built in port processes stem from the interaction, within their boundaries, of a vast variety of entities. As these entities often believe to be of conflicting interests (despite their common target to keep the final customer satisfied) and focus on their own operation only and not on the system's, tend to fragment the inter-company process of moving cargo through the port. This fragmentation leads in many cases to a significant negative impact on the final customer of the chain.

Acknowledging this matter leads to the need to re-engineer port processes on the basis of the Value System concept, i.e. of a flexible networking of all entities involved in port processes. Due to the rather limited (geographical and organisational) dimensions of SMPs and the relatively high levels of personal contact observed in them, such a system can be easily developed and maintained. Moreover, it can accrue economies of scope to all the small/medium 'partners' involved and increase significantly the system's flexibility and responsiveness. This is mainly due to the radical improvement achieved in the domain of integrated data processing and information handling.

Table 2 - The matrix for formulating alternative scenarios for SMP operation (For columns (4) and (5), it is possible that passing to a higher level presupposes that the lower level requirements have been fulfilled)

	(1) VS Scope	(2) VS Focus	(3) Decentralisation	(4) Alteration of Physical Layout/ Upgrade of Equipment	(5) Review of Legal/Institutional Environment
A. Low	Inclusion only of port actors located within the physical limits of the port area, i.e. harbour master, terminal operator, pilots, tugs, ice-breakers, mooring gangs, stevedores, Customs and other Authorities etc.	Port management • exchange of operational information among port actors for more effective planning of their operation	Fully centralised, i.e. all information is gathered and stored within the port information system, therefore: • Information acquisition from one point only • Data entry at one point only	• Minor improvements in port layout • Separation of gate facilities for entering and exiting vehicles. Establishment of different lanes for domestic/EU, international (import/export) and transit traffic • Special areas for entering/exiting vehicles to pull aside for inspections/controls. • Separate lanes for customers using advanced technology	• No confirmation necessary that the port can accept the vessel if its ETA message has been accepted with no comments. The Ship Master bears the responsibility of conforming with port regulations regarding cargoes and vessel dimensions accepted. • Establishment of electronic access to Customs
B. Medium	Inclusion of the port actors of (A) plus the shipping company (or its agents) and the cargo agent.	Provision of information to customer • regular exchange of selected operational information among actors and customers for more effective operations planning for both	Semi-decentralised, i.e.: • Information acquisition from one point only (the port information system) • Data entry either centrally or, if possible directly by the entity which creates the information.	• Improvement of maritime access. • Improvement of infrastructure at links with the land transportation systems (dedicated lanes for entering/exiting the port, VMS with traffic information etc.) • Relocation of areas for Customs and other controls outside the terminal operational area. • Storage areas upgrade/expansion • Upgrade/acquisition of cargo handling equipment	• Issuing Pilotage Exemption Certificates for liners or other vessels calling often at the port
C. High	Inclusion of all the entities in (B) plus allied ports and other related Organisations.	VS Customer management • sharing of information (of operational, tactical or even strategic nature) among the VS actors aiming at optimising their relationship to offer maximised VS Customer satisfaction	Fully decentralised, i.e. the entity which creates the information, bears it, therefore, • acquisition of information from the entity that creates it • critical information which must be readily available centrally, is fed into the system directly from the entity that creates it.	• Dedicated berths tailor-made for specially built vessels • Facilities and equipment for cargo handling operations at anchor • Dedicated facilities for special cargo	• Rationalisation and harmonisation of the national rules regarding the dimensions and characteristics of vessels requiring pilotage/towage • Establishment of a money or other guarantee in order to unbind cargo handling from controls by competent Authorities but ensure that the duties fixed will be paid.

In the framework of the SPHERE project, generic SMP processes were re-engineered on the basis of the Value System concept. Several alternative scenarios for re-engineered SMP operation and organisation were produced. These scenarios vary from each other as regards the entities forming the nodes of the Value System, the Information System materialising the links between these nodes, and the logistical details of cargo and information handling along the supply chain created by the port actors and customers.

The scenarios are generic and modular hence, they can be customised and applied to almost any SMP.

REFERENCES

Ballé, M. (1995), **The Business Process Re-engineering Action Kit - A Five Day Plan to Redesign your Processes**, Kogan Page, London.

Branch A.E. (1986), **Elements of Port Operation and Management**, Chapman & Hall, London.

Branch A.E. (1994), **Export Practice and Management**, International Thomson Business Press, London.

Downs, D.E. (1992), **Understanding the Freight Business**, Micor Freight UK Ltd, London.
Goss, R.O. (1990), Economic policies and seaports 1: The economic functions of seaports, **Maritime Policy and Management, Vol. 17, No 3**, p. 207-219.

Hammer, M., and Champy, J. (1993), **Re-engineering the Corporation: A Manifesto for Business Revolution**, N. Brealey, London.

Hammer, M. and Stanton S. (1996), **The Re-engineering Revolution Handbook**, HarperCollins, London.

Institute of Shipping Economics and Logistics Bremen (1985), **Port Management Textbook - Containerization,** Bookseries n° 10, ISL, Bremen.

Institute of Shipping Economics and Logistics Bremen (1990), **Port Management Textbook Vol.1 "General Aspects of Port Management"**, ISL Bremen.

Quinn, J.B., Anderson, P. & Finkelstein, S. (1996), "Managing professional intellect: Making the most of the best", **Harvard Business Review Vol.74**, March-April, p.71-80.

SPHERE Consortium (1997), **D1: Investigation of Port System Requirements**, Deliverable of the SPHERE Project (WA-95-SC.224), sponsored by CEC-DGVII.

TELE*flow* Consortium (1996), **Viable Process Re-engineering Approaches for VS-Design**, Deliverable 3.2 of the TELE*flow* Project (TE2011) sponsored by the European Commission (DGXIII).

UNCTAD (1985), **Port Development: A Handbook for Planners in Developing Countries**, Report TO/B/C.4/175/Rev.1, New York