

# UNCTAD MONOGRAPHS ON PORT MANAGEMENT

*A series of monographs prepared for UNCTAD in collaboration with the International Association of Ports and Harbours (IAPH) and, for this monograph, the International Association Cities and Ports (IACP)*

14

## **Sustainable development strategies for cities and ports**

*by*

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#### NOTE

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## INTRODUCTION TO THE SERIES

In the ports of industrialized countries, operating systems and personnel development are based on skills acquired through experience, on emulation of other industries and on the innovation which is easily undertaken in advanced industrial environments. These means are generally lacking in developing countries, and port improvements occur only after much deliberation and often through a process of trial and error. Some means are required by which ports in developing countries can acquire skills that are taken for granted in countries with a long industrial history, or can learn from other national experiences with new developments and how to adapt to them.

Formal training is one aspect of this, and UNCTAD has devoted considerable effort to developing and conducting port training courses and seminars for senior management and to preparing training materials to enable middle-management courses to be conducted by local instructors. It was felt that an additional contribution would be the availability of well-written technical papers devoted to common problems in the management and operation of ports. The sort of text that will capture an audience in the ports of developing countries has to be directed at that very audience, and very few such texts exist today.

Following the endorsement of this proposal by the UNCTAD Committee on Shipping in its resolution 35 (IX), the UNCTAD secretariat decided to seek the cooperation of the International Association of Ports and Harbours, a non-governmental organization in consultative status with UNCTAD, with a view to producing such technical papers. The present series of UNCTAD Monographs on Port Management represents the results of that cooperation. It is hoped that the dissemination of the materials contained in these monographs will contribute to developing the management skills on which the efficiency of ports in developing countries largely depends.

Rainer Vogel  
Officer-in-Charge  
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## FOREWORD

When UNCTAD first decided to seek the cooperation of the International Association of Ports and Harbours in producing monographs on port management, the idea was enthusiastically welcomed as a further step forward in the provision of information to management of ports in developing countries. The preparation of monographs through the IAPH Committee on International Port Development has drawn on the resources of IAPH member ports in industrialized countries and on the willingness of ports in developed countries to record for the benefit of others the experience and lessons learnt in reaching current levels of port technology and management. In addition, valuable assistance has been given by senior management in ports of developing countries in assessing the value of the monographs at the drafting stage.

I am confident that the UNCTAD monograph series will be of value to managements of ports in developing countries by providing indicators to be used in decision-making on improvements and technological progress and optimum use of existing resources.

The International Association of Ports and Harbours looks forward to continued cooperation with UNCTAD in the preparation of many more papers in the monograph series and expresses the hope that the series will fill a gap in the information currently available to port managements.

Goon Kok Loon  
Chairman  
Human Resources Committee  
IAPH

## INTERNATIONAL ASSOCIATION CITIES AND PORTS

The International Association Cities and Ports makes it possible for ports to get to know one another and to hold dialogues with the urban community.

The International Association Cities and Ports (IACP) is the first international organization bringing together ports, cities and their representatives, chambers of commerce, urban and spatial planners, representatives of municipalities or even of Governments, as well as numerous private firms and other organizations. Its purpose is to encourage a genuine symbiosis between cities and ports, and increase contacts between the various entities seeking to enhance the development of ports.

Established in France in 1988, IACP now has 125 institutional members. It organizes international meetings, publishes an information bulletin, operates a documentation centre and provides expert input on specific issues of international concern. More and more port cities are becoming members, from international metropolises to small coastal cities. All are trying to make the best use of their ports, both to meet their economic needs and to improve the quality of life of their communities. Member cities have the opportunity to share their experiences in reorganizing obsolete port areas or in promoting economic relations and development in synergy with the port.

For the international community, which is giving thought to ports, the Association represents a new forum for reflecting on the future of ports. A dynamic port which forms part of the urban, economic and regional framework, is a major regional asset. Promoting the region goes hand in hand with promoting its port or ports, not just as economic engines, but as unique gateways to the world. This encourages greater international respect for a region as a whole.

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## Chapter I

### INTRODUCTION

This monograph has two purposes. One is to lay the foundations for a historical model which, in addition to explaining the development of port-city relations throughout history and identifying some of the basic elements of those relations, provides some keys to a proper interpretation of contemporary port-city issues. If the concept of sustainable development is understood as a form of progress that "meets the needs of the present without compromising the ability of future generations to meet their own needs", 1/ then analysing and interpreting the present-day reality of port-city relations using categories and constructs from another era will not only fail to clear up the confusion generally surrounding these relations, it will also undoubtedly make it difficult to take decisions that do not seriously compromise the future.

The second purpose of this monograph is to propose a model approach to contemporary city-port issues, which are at present inevitably marked by the transformation of the material basis on which our society has relied for centuries. This structure change, which involves a historic watershed on a par with, or greater than, the change ushered in by the Industrial Revolution, calls for a new framework for port-city relations, one in which, among other questions, both their components and the relative weight of those components are reconsidered.

The idea of the proposed model is to overcome the traditional territorial and somewhat mechanistic approach to the question whereby the components of the question are analysed rather than their interactions. Accordingly, the proposed model, although still being formulated, endeavours to fit in with a holistic approach to the problem, in which the whole is not the sum of its parts, but rather the sum of the parts and their inter-relations. It is the relations between the parts which give the whole its importance. 2/ This approach involves acceptance of such concepts as ambiguity, instantaneity, intuition and "fuzzy logic" in the basis for this model.

Nevertheless, the model presented here has major limitations if it is to be considered completely holistic. Two of those limitations are particularly important. First of all, the model attempts to adapt itself to the reality of a concrete territorial context - the port cities of the countries of western Europe. Secondly, the model approaches the problem from the standpoint of the port.

The model proposed here in order to explain the processes of restructuring ports and their relations with cities can be applied to most of the port cities of western Europe, which have generally been affected by similar problems and changes. The model could also be used in considering conditions in ports in other parts of the world, bearing in mind that the restructuring processes have followed their own particular course on each continent, depending on economic, political, social and cultural circumstances. A bibliography is available which gives a rough idea of the historical evolution in other geographical regions. 3/



## Chapter II

### HISTORICAL APPROACH TO THE REASONS FOR CHANGES IN PORT-CITY RELATIONS

While few enterprises have ever survived more than 100 years, in general ports are entities that over the centuries have demonstrated their durability. The history of many old and important port cities provides a wealth of valuable experience and examples of sustainable development that help explain their present unique position among the world's maritime cities.

It is nevertheless clear that this model of progress has not been shared by all port cities, since a large number of the ports that developed prior to the Industrial Revolution were unable to cope with the crisis and the changes entailed by the transition from an agricultural to an industrial economy. The result was a steady decline of those ports, due both to the gradual shrinking of high value-added port activities (such as commercial traffic) and to the difficulties in attracting the dynamic activities emerging in the new economic context.

Today, at the dawn of another great transformation in civilization, many port cities are again finding not only their "status quo", but also their survival in the emerging new situation, threatened. Against this background, they are beginning to reconsider their priorities and to define new strategies in order to keep up with the transformations now under way. Overcoming these threats and turning them into opportunities inevitably means adopting a new attitude and confronting major challenges and profound changes, including the model for port-city relations.

The basic stages in the historical evolution of ports, and the respective identifying characteristics and elements that have shaped their transformation, are summarized in figure 1. This figure will also be useful in reading the rest of this chapter and the next.

#### 2.1 The port and the city in pre-industrial societies

Until the late eighteenth century, <sup>4/</sup> agriculture was the basis for the economic structure of all societies, and the rare industrial products of that time were handmade. This economic system was sustained by the consumption of renewable sources of energy (muscle-power, forests, water, land, air, etc.) and the use of a very simple and limited technology, intended primarily for increasing the potential of human and animal strength. Consequently, production capacity was limited and slow, and each community produced almost everything it needed, generating some scarce and valuable surpluses in the process.

Figure 1

Pre-industrial Economies  
Organizational basis: agriculture

Industrial Economies  
Organizational basis: industry

Post-industrial Economies  
Organizational basis: information

Production base

1.	<ul style="list-style-type: none"> <li>• Renewable sources of energy</li> <li>• Simple technologies</li> <li>• Craft production</li> </ul>	<ul style="list-style-type: none"> <li>• Massive use of non-renewable sources of energy</li> <li>• Large-scale technological development (steam engine, combustion engine, electricity)</li> <li>• Mechanization and specialization</li> </ul>	<ul style="list-style-type: none"> <li>• Diversification of sources of energy (renewable and non-renewable)</li> <li>• Growing application of digitalized information and skills to management of the production processes</li> <li>• Automation</li> </ul>
Supply	<ul style="list-style-type: none"> <li>• Limited production capacity</li> <li>• Limited and valuable surplus</li> </ul>	<ul style="list-style-type: none"> <li>• Mass production of goods at low cost</li> </ul>	<ul style="list-style-type: none"> <li>• Reaching the consumer: production to order</li> <li>• Mass production of personalized goods in extremely short series</li> <li>• Quality; products with shorter life cycles</li> </ul>
Demand	<ul style="list-style-type: none"> <li>• Low consumption capacity for foreign-produced goods</li> </ul>	<ul style="list-style-type: none"> <li>• Higher standard of living. Increased consumption capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Centre of production decisions</li> <li>• Individualization, fragmentation and diversification of consumption</li> <li>• Acceleration and changing needs</li> </ul>
Market	<ul style="list-style-type: none"> <li>• Marginal activity within the economy</li> <li>• Local, commercial and regional markets</li> <li>• Elementary transaction tools</li> <li>• Limited population involved with the market</li> </ul>	<ul style="list-style-type: none"> <li>• Commercialization of the economy: geographical and social expansion of the market</li> <li>• Mass distribution and marketing</li> <li>• Increasingly complex distribution systems</li> </ul>	<ul style="list-style-type: none"> <li>• Processes of economic integration, expansion</li> <li>• Explosion in variety, segmentation and personalization</li> <li>• The market: needs identified anywhere</li> </ul>
Transport	<ul style="list-style-type: none"> <li>• Limited movement (geographical distribution and volume)</li> </ul>	<ul style="list-style-type: none"> <li>• Multiplication of flows of goods and reduction of costs</li> </ul>	<ul style="list-style-type: none"> <li>• Establishment of transport chains</li> <li>• Intermodality, logistics, security</li> <li>• Reduction and reliability of delivery procedures</li> <li>• Demand for movement of goods</li> </ul>
Communication	<ul style="list-style-type: none"> <li>• Limited flows of information and restricted, private channels of access</li> </ul>	<ul style="list-style-type: none"> <li>• Large-scale production of information</li> <li>• Establishment, development and diversification of open, individual and collective communications media</li> </ul>	<ul style="list-style-type: none"> <li>• Individualization of the communications media</li> <li>• Multimedia, cyberspace and interactivity</li> <li>• Mobile communication systems</li> </ul>
Means			

PRODUCTION INTERCHANGE

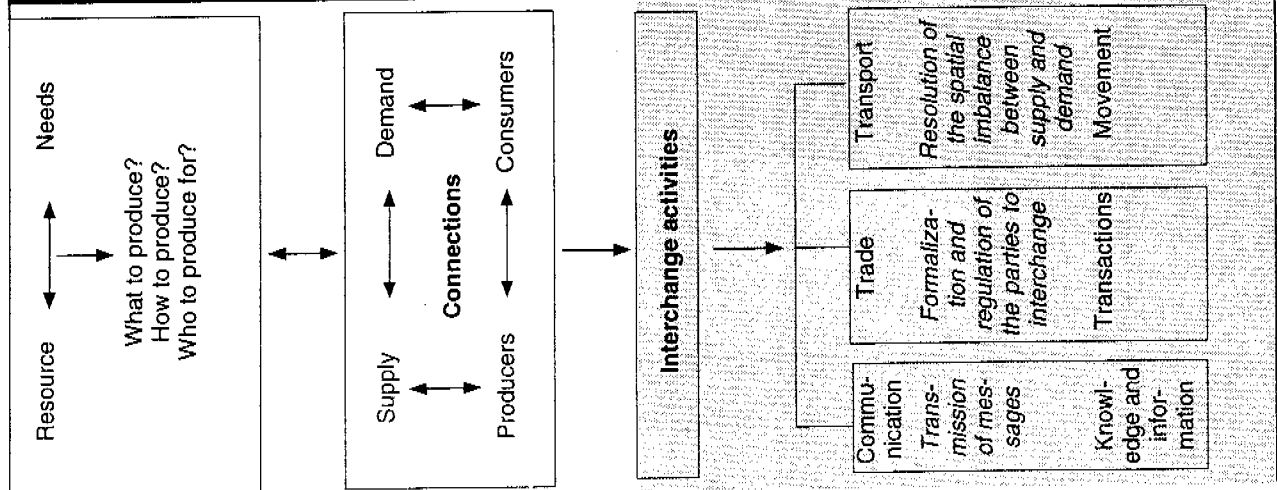


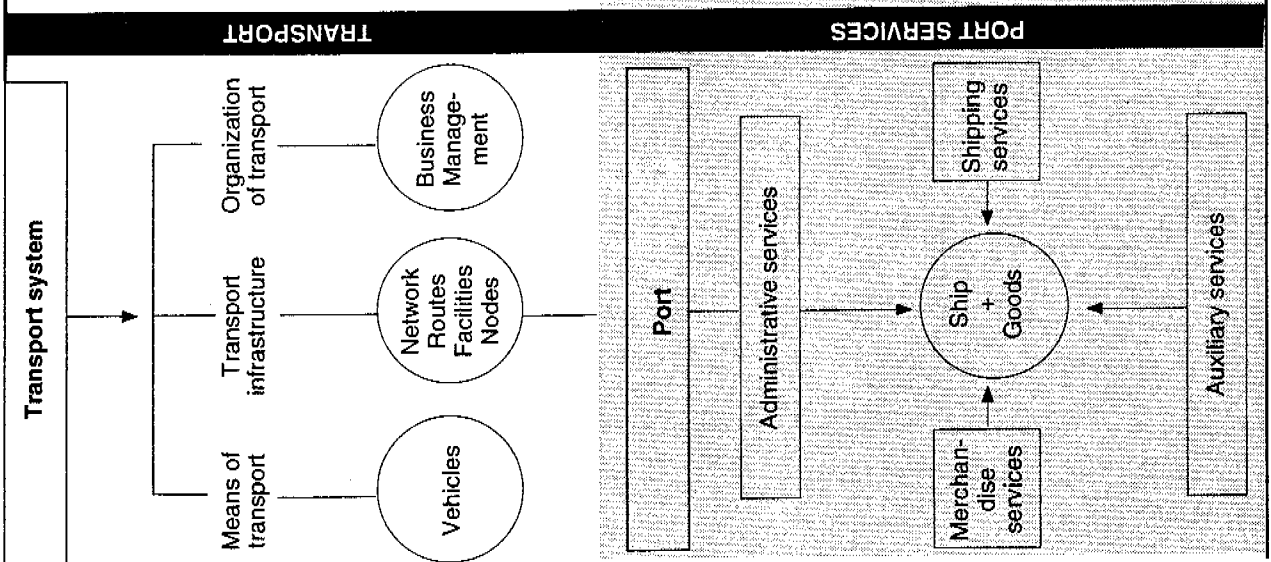
Figure 1 (continued)

**Pre-industrial Economies**  
Organizational basis: agriculture

**Industrial Economies**  
Organizational basis: industry

**Post-industrial Economies**  
Organizational basis: information

<p>3.</p> <p><i>Infrastructure</i></p> <ul style="list-style-type: none"> <li>• Slow vehicles with low carrying capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Diversification and specialization of increasingly fast, reliable vehicles with greater carrying capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Cost reduction</li> <li>• Flexibility</li> <li>• High speed</li> <li>• Satellites</li> </ul>
<p><i>Organization</i></p> <ul style="list-style-type: none"> <li>• Compartmentalized, rudimentary, unreliable and limited networks</li> <li>• Individual firms or firms with small groups of owners</li> </ul>	<ul style="list-style-type: none"> <li>• Large-scale infrastructure development</li> <li>• Establishment of an interconnected transport system</li> <li>• Accessibility of the entire territory</li> <li>• Emergence of corporations</li> <li>• Development of middleman operations</li> <li>• Centralized management</li> </ul>	<ul style="list-style-type: none"> <li>• Intensive use of motorways and airports</li> <li>• Development of telecommunications networks</li> <li>• Definition of economic and transport economic objectives</li> <li>• Decentralization integrated through networks</li> <li>• Autonomy and flexibility</li> <li>• Abolition of middleman operations</li> </ul>



### 2.1.1 An embryonic distribution system

Existing limitations in technology and energy, the scanty surplus production that these economic structures were capable of generating, and the low consumption capacity of these societies encouraged the emergence of an individualized, weak, restricted and very rudimentary distribution system.

Given that the population used virtually all its resources to produce the goods it would itself eventually consume, commercial activity represented a very small part of overall economic activity, the organization of which depended on the scanty surpluses over consumption that the production system was able to generate. Consequently, only a tiny fraction of the population depended on the market, and most people lived outside it.

The concept of the market was closely related to physical and territorial factors. Slowly, local markets would tend to give way to regional markets, the consolidation of which would lead to the regionalization of commerce. At the end of this period, regional markets will thus be fully developed and national markets at various stages of formation. In this context, the existence of international trade, while very limited, was highly valued.

If the potentially tradeable surplus was scanty, the volume of trade was also quite low, being influenced by the limited capacity, slowness and high cost of transport which made it extremely difficult to supply the market. The predominant feature of interchange facilities of that time was their mediocre capacity, such that any improvements had a powerful influence on market linkages and successive changes in scale.

Land transport, which relied on a dangerous very primitive network of trails and roads in poor condition and with limited infrastructure, consisted basically of mule and wagon trains. All of this meant very high costs, which could be supported only by products of high value and low volume, or over short distances. 5/

Maritime transport emerged as the preferred form of locomotion - the cheapest, most reliable and most capable of moving large volumes of merchandise. In addition, it was in the transport sector that the technological innovations of this period were the most important and the most constant, involving both the development of a sizeable transport industry and the strengthening of the commercial life of maritime communities.

### 2.1.2 Port activity, an urban function

In pre-industrial societies, which were practically self-sufficient and were based on agriculture, port activities developed in those coastal communities that engaged in fishing, maritime trade and naval warfare as a supplementary or, when circumstances so required a main economic activity. The considerable importance of the intercontinental colonial trade undertaken by the European colonial Powers, such as Portugal, Spain, Holland, England and France, beginning in the sixteenth century, should be stressed. Under the protection of settlements whose natural settings lent themselves to navigation

and provided a harbour for ships, a string of small port nuclei developed, taking on a life of their own, and continued to develop and form their own hierarchy, largely parallel to the evolution and structuring of markets.

For many of these communities, maritime and port activities were not only one of the main sources of wealth and employment, but also one of the fundamental channels for progress. Their links with the sea spurred the development of important activities, such as shipbuilding, fish canning, naval bases, commerce, a specialized press and artistic activity. On top of all this was the fact that, because they were centres of physical communications, these urban port nuclei had access to the scanty flows of information produced in that compartmentalized world. Many of them would become privileged parts of the territory, giving rise to a specifically maritime culture in which for the most part the social structure of communities revolved around the wealth produced by the sea. "The port was a business centre as well as a place where ships were loaded and unloaded, merchandise put into storage ships built and repaired, and crews assembled. Shipowners, merchants, sailors and stevedores populated the port cities." 6/ In many instances the interrelationship between the urban nuclei and the sea was such that the cities even appropriated maritime port symbols for their emblems and coats of arms, and the images habitually used to represent the cities (engravings, drawings, paintings) were almost always those of the waterfront.

### 2.1.3 Port-city relations

From an economic standpoint, in many cases the port was at the hub of the life and activity of the urban centre, first of all because of its capacity to generate directly a large number of jobs for the city's residents. Sailors, shipbuilders, stevedores, merchants, fishermen, soldiers and ship's carpenters were just some of the most common and numerically important occupations in the pre-industrial port nuclei that lived off the resources provided by the sea. In some such centres, maritime activities underwent singular development: improvements in navigation and training centres for sailors were promoted in Lisbon and Seville; there was a remarkable boom in public building in Cadiz because of the fortifications; companies were founded to provide Amsterdam shipbuilders with the capital needed for colonial trade; the visual character of Bordeaux was strongly influenced by the sugar trade.

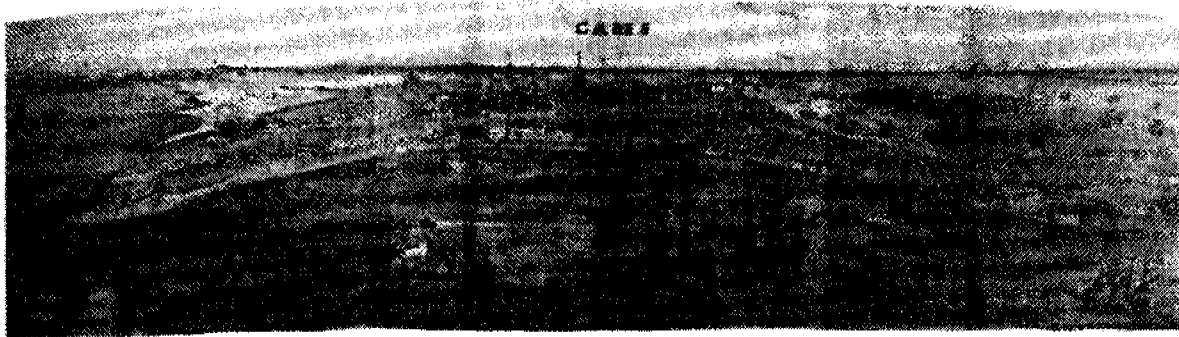
In terms of space, the relationships of coexistence between the ports and their urban counterparts were characterized by proximity and immediacy. Apparently lacking any formal territorial delimitation, productive, commercial, port and even residential activities coexisted in the same spaces. So much so that frequently the little infrastructure built for navigation either remained part of the city itself or enabled it to expand by opening up new areas. Port facilities were thus in many cases the vehicle for the city's physical development, influencing its texture and shape.

Accordingly, the territory devoted to port activities as such was an essential part of the urban structure, in which parades, festivities, sports competitions, rallies and so forth were held, emphasizing its symbolic and totemic value.

Aware of the importance of maritime activities, port management was a constant concern of local public institutions, which in many cases, if they

did not promote specific bodies for their administration and development, were responsible for raising funds to invest in their infrastructure, or finding agents for their commercial operation. In this way, the administration of ports relied basically on local entities 7/ that furnished them with their own specific regulations. The work begun by the IACP in 1988 is vital in this regard.

Figure 2: The port of Cadiz in the 17th century



## 2.2 The port-city since the Industrial Revolution

By about the mid-seventeenth century the production system began to undergo a radical transformation: agriculture was replaced by industry as the basis of the economy. The replacement of traditional sources of energy by other non-renewable, low-cost sources (coal, gas, petroleum), along with the tremendous progress being made in technology (steam engines, combustion engines, electricity, etc.), encouraged the development and expansion of industrial activities. This change, which first occurred in England, spread to other European countries during the nineteenth century. Craft production was replaced by industrial production in factories. The machine, the factory, and later, in the early twentieth century, the assembly line, generated a manufacturing system based on long production cycles turning out large quantities of standardized, low-cost goods.

### 2.2.1 The phenomenon of mass distribution

One of the major consequences of the Industrial Revolution was the radical separation between production and consumption. Mechanization, specialization and the low sales prices that mass production permitted meant that most of the goods produced could be earmarked for commerce. The economy became commercialized and the market underwent an accelerated expansion, both geographically 8/ and through the continuous integration of new goods, as well as through increasingly complex distribution processes. Individual distribution gave way to mass distribution and marketing; middleman operations proliferated, both to channel raw materials and to distribute goods to consumers.

The production capacity of the industrial economy required distribution mechanisms suitable for moving large quantities of raw materials and both semi-finished and finished products quickly, reliably and inexpensively. With the development and expansion of industrial activities came a total transformation of the means and forms of transport; transport ceased to be something makeshift and became a vital part of social and economic life.

The traditional systems used for moving goods and people were replaced by modern forms of transport that were increasingly fast, flexible and reliable, and with greater carrying capacity. At sea, great iron ships propelled by steam engines, and later by combustion engines, slowly began to replace the wooden sailing ships that had hitherto accounted for the lion's share of maritime transport. On land, mules and wagons were rapidly displaced, first by the railways and then by automobiles and lorries, which became the major forms of land transport. Finally, aviation appeared, revolutionizing the concept of time and space in transport.

Whereas previously transport systems had had only a slight effect on the natural environment, the industrial economy brought the massive construction of complex and costly artificial infrastructure. Railways, highways, motorways, ports and airports made up a vast transport system which, by interconnections within itself, provided a geographical backbone and made almost every area accessible.

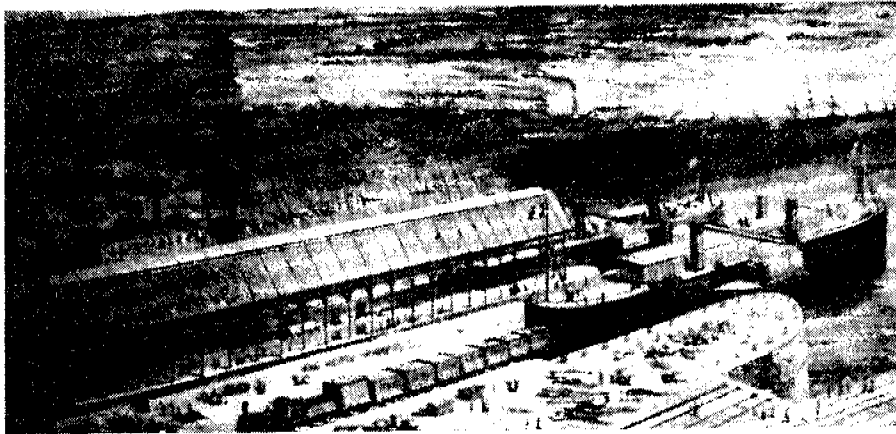
#### 2.2.2 The industrial port-city

The corollary of industrial production was a far-reaching spatial redistribution tending toward the concentration of men and materials. The availability of raw materials (coal, iron), and economies of scale led the nascent industries to seek central locations. As a result, towns in suitable locations attracted industry, which in turn stimulated their growth. In this way, the town became the economic heart of society, transforming itself into the main centre of production and consumption, as well as the fundamental node of the commerce and transport networks. In this context, maritime towns took on a leading role, since the important part played by maritime trade in the industrialized nations' foreign relations meant that the key centres were frequently established on the coast. 2/

Those maritime towns capable of attracting the major industries and handling the huge movements of goods produced by the major industrial agglomerations and regions gradually assumed, albeit not without major transformations, a dominant position in the port system. The emergence of new forms of economic organization, of traffic etc., stimulated a major rethink of the meaning of port activities and of relations between the port and the city. Those ports which for various reasons were unable to ride the wave of industrialization witnessed the inexorable drift of a large part of the merchandise which had formerly been shipped from their own quaysides to other ports that were vigorously emerging from an already outdated port hierarchy. Illustrations of this trend may be found along Spain's Cantabrian coast with the rise of Gijón to the detriment of Avilés and the clear pre-eminence of Bilbao. By the close of the period, as a result of the reconstruction after the Second World War, major industrial ports such as Rotterdam were emerging.



Figure 3: The coming of the industrial port





### 2.2.3 Structural changes in ports

The technological progress accompanying the Industrial Revolution radically changed the conditions of maritime transport in terms of *time and space*. 10/ On the one hand, the new techniques and materials used in shipbuilding made it possible to increase the size and cargo capacity of ships. This in turn facilitated not only the expansion of trade in goods, but also trade in products whose bulk and low value had hitherto made them unprofitable for maritime transport. Thus, on account of the greater complexity and diversity of merchandise, ships began gradually to adapt to the needs of the cargo, a process which would culminate in the specialization of vessels.

The expansion of trade, in conjunction with the structural transformation of the merchant fleet, hastened a momentous organizational change which had begun during the previous period with intercontinental colonial trade: the establishment and development of major shipping companies. Only large enterprises were capable of undertaking this change in scale and of simultaneously setting up a network of agents from a head port where their management was concentrated, bringing the demise of the "Captain entrepreneur".

Moreover, the autonomy deriving from the use, first of steam and subsequently of oil, to propel vessels in preference to the traditional system of wind propulsion, enabled vessels to sustain higher speeds. This made it possible to regularize transport, and gave rise to another significant organizational change: the establishment for the first time of regular lines with scheduled ports of call.

The technological changes in shipping (energy source and means of propulsion, shipbuilding technology and materials, etc.) were one of the key factors in the radical transformation which ports had to face by providing new infrastructures and services. First of all, berths had to be longer with increased depth of water capable of accommodating the new vessels. Secondly, in addition to reorganizing ports internally, it was necessary to enlarge them in order to meet cargo handling and storage requirements and to provide more powerful and efficient loading and unloading equipment.

The new economic, technological and social system ushered in by the Industrial Revolution required radical change in ports, and many of them, those best prepared, underwent wholesale modernization of berthing and mooring systems and cargo handling and storage facilities. Traditional wooden berths were replaced by more modern concrete structures and many of the manual stevedoring tasks were taken over by modern mechanical cranes. Berths became specialized, cargo sheds and warehouses were built and port operations reorganized on industrial lines.

Moreover, in the process of becoming efficient transport hubs, these ports were also gradually penetrated by industry itself, as well as by the new transport infrastructures (railways, roads, pipelines). Cases in point are Dunkirk, with the steel industry, and by Antwerp and Rotterdam with the petrochemical industry.

#### 2.2.4 The weakening of links between port and city

As a whole, the new conditions entailed profound conceptual changes regarding the port area itself and relations between ports and their immediate hinterland. First of all, as already mentioned, the port underwent a far-reaching physical transformation and internal reorganization. The belief 11/ that *big* is synonymous with *efficient* in many cases led to the development of huge port complexes separated from the cities, and organized internally in accordance with their various specialized uses. With this trend towards independent development, ports established themselves as seemingly autonomous units isolated from their immediate environment.

This separation from the city was not only physical but also social and cultural. While industrialization led to the introduction into the urban port centres of new activities which diversified their economies and restored the balance of wealth contributed by the port to the community as a whole, their urban development was to a large extent oriented away from the sea. As a result cities gradually lost contact with and interest in port activities and in maritime culture and traditions to which many of them owed their existence. Relations between port and city began to be viewed in terms of coexistence, a form of cohabitation disrupted by this mutual and gradual divorce which was largely responsible for the problems of understanding and communication that have in many cases put their relationship onto a conflictual footing, particularly in territorial terms.

This situation is even more apparent in port organization and management; in some countries, such as France and Spain, after having been subject to different administrative regulations specific to each port, port organization and management were gradually integrated through a homogenous set of regulations into a centralized administrative unit. As a result, local institutions saw their capacity directly to influence port management steadily decline and citizens began, with increasing indifference, to look on port activities as more alien.

However, the Industrial Revolution also had striking repercussions on cities. Their populations rose in spectacular fashion as a result of migratory movements brought about by job opportunities in industry. Cities thus experienced spectacular growth, while uncontrolled and unplanned operations leading to the deterioration of the existing urban space and of the surrounding environment went ahead at the same time as urban renewal and major expansion projects. 12/

In this way, the structure, organization, development patterns and size of cities changed dramatically as did the way of life and values of traditional cities. The need for new infrastructure and equipment, more intensive land use, the increasing use of cars and the demand for a better quality of life are some of the problems besetting cities, and ports have a part to play in solving them.

## 2.3 Changes in ports at the close of the twentieth century

### 2.3.1 The development of a new system of wealth creation

Just as the world was transformed by the Industrial Revolution towards the middle of the eighteenth century, now, at the close of the twentieth century, a technological revolution, essentially organized around the processing, transmission, interchange and programming of data, has begun to change the time and space coordinates underlying all human activity.

Just as raw materials and energy were two of the fundamental factors in the Industrial Revolution, information is now the *basic nucleus around which mankind's new capacity to control its environment and consciously to alter its forms and levels of existence has been built.* <sup>13/</sup> We are thus witnessing the birth of a new system of wealth creation, <sup>14/</sup> involving a profound reassessment of modes of production, management, consumption and commerce.

First of all, decision-making relating to the production of goods is shifting from the producer to the consumer; as a result, not only is the trend away from selling products once they have been produced to producing products once they have been sold, but the final product configuration is also being determined by the consumer, leading to the production, marketing and distribution of mass customized goods. <sup>15/</sup>

Secondly, in the new post-industrial economy a market is no longer a physical area where things are bought and sold, but an identified need, and as such, an intangible item. <sup>16/</sup> Consequently, the significance of markets is changing and their new definition implies that factors which are neither spatial or localized have to be taken into account: the market exists not in a specific location, but wherever necessary.

In conjunction with these processes, we are witnessing the development of a worldwide market area which has already begun to operate as a genuine unit for production, trade, capital flows, information and labour, as a result of the acceleration and increase in trade deriving from the internationalization of economic activities and the globalization of markets (the integration of the European Union (EU), the free trade area comprising the United States, Canada and Mexico, the establishment of free-market economies in Eastern Europe, etc.).

The need to satisfy and adapt to a constantly changing market lies at the basis of the far-reaching transformation which firms are undertaking both in their manufacturing processes (automation, quality controls, safety tests, etc.) and in their methods of management (flexible manufacturing centres, use of just-in-time systems, the introduction of logistics as a means of optimizing the adjustment of the firm's output to market demand etc). The foregoing is accompanied by a change in the approach for doing business whereby companies nowadays attempt to get to know and understand local markets from a global perspective. *The aim will be a seamless process in which an item is made just before it is delivered and sold.* <sup>17/</sup>

However, responding satisfactorily to the requirements and trends of a consumer-oriented market also implies managing a constantly increasing volume of information. Nowadays, suppliers, manufacturers, distributors and

retailers - in short the entire production-distribution chain - are in the throes of a major upheaval. With every day that goes by, firms' business activities are increasingly interrelated and increasingly depend on information and electronic networks for purchasing sales, invoicing, stock control, and so on (bar codes, electronic data-interchange, etc.).

Thus, alongside the physical flow of merchandise an enormous flow of documents has developed (invoices, orders, delivery notes, bank and customs forms, etc.) which, if not promptly dealt with, constitutes an obstacle to trade. In order to process these flows of information firms are joining computerized, data-interchange and audiovisual networks which link up the entire production-distribution chain in real time.

However, important as the changes in the manufacturing system may be, re-examination of the management of the physical routing of merchandise is no less important in order to optimize not only the transport phase, but also other phases, such as handling, stock management, pre-marketing services (packaging and labelling), commercial and administrative services and even some industrial finishing processes.

Thus, transport has started to be viewed as a further phase in the manufacturing process and a source of competitive advantages in terms of price and service (better quality, shorter delivery times, etc.). To achieve this, vehicles are being equipped with mobile communication systems which improve travel conditions and safety, as well as specialized systems for determining the best routes in each case. Access to information through services such as videotext is making it easier to optimize cargoes, to select the most suitable routes, to have data on road and weather conditions, etc. 18/

New working procedures are being introduced in warehouses (robots for loading and unloading, packing and pre-strapping crates, etc.) which help to optimize the use of space and stock control. 19/ Lastly, technological progress in goods handling and standardization is making it possible to transfer numerous functions from the production sphere to various nodal points on the transport network.

### 2.3.2 Structural changes in maritime trade and transport

For some time now the features that characterized the structure of world maritime trade have begun to undergo a further profound change as a result of the transformations affecting the time, spatial and material aspects of economic activity. The rapid incorporation of new areas of production and consumption into the international market, with its corollary of diversification and multiplication of trade flows; the transnationalization of enterprises and their activities; the increase in trade in finished and semi-finished products at the expense of raw materials and energy products as a result of the establishment of primary processing industries in the raw material-producing countries and better use of raw materials with the introduction of new production technologies; the gradual fragmentation, diversification and destandardization of markets which, rather than mass production, require shorter and more customized production runs, thus increasing the number of shipments while at the same time reducing their size; and the emergence and development of new products, 20/ are but some of the factors underlying the changes taking place in world trade.

These developments in the structure of world trade are necessitating profound changes in the planning and execution of goods transport and distribution. First of all, the need to link up the new centres of production and consumption has led to the emergence of new connections, frequently subordinate to a small number of main connections, within the maritime transport network. Secondly, the need to bring producers nearer to consumers has led to the development of integrated transport chains which, using concepts such as intermodal transport and logistics, are having far-reaching effects on transport organization, not the least being the development of procedures that cut out a middleman.

However, alongside the emphasis on factor cost, elements such as the speed and punctuality of deliveries and the security of increasingly valuable goods have begun to take on overriding importance in transport decisions.

In addition to all this, there are the technological advances in the area of goods handling and standardization such as containerization, palletization and the boom in ro/ro traffic.

### 2.3.3 The port as logistical centre

As a whole, these ongoing changes in production and distribution inevitably make it necessary to re-examine the proper role of ports in the emerging new economic and territorial environment. The new system of wealth creation has begun to require ports to be something more than simply efficient links and hubs in transport networks. On account of their strategic location and their unrivalled position in distribution processes, ports are destined to play a key role in organizing the trade in goods and data interchange and to become *third generation ports*. <sup>21/</sup> This supposes not only the modernization of the traditional services offered by ports, but also their enhancement by the provision of a range of logistical services capable of generating comparative advantages over other transport infrastructures.

Alongside straightforward transport services (loading, unloading and warehousing, etc.), ports have to include in their range of services the capacity to perform supplementary operations such as cargo consolidation and break-bulk and the accommodation of pre-marketing activities (labelling, packaging, etc.). However, if a port is to become a genuine control centre for the physical, administrative and organizational functions of transport chains, it must provide services that facilitate the processing and management of the administrative, commercial and logistical information associated with flows of merchandise. These services depend on the development of three basic instruments of communication and integration: telematics, electronic data interchange (EDI) and the teleport. Their introduction and assimilation is capable not only of facilitating the port's insertion into the productive fabric and into international transport chains and marketing networks, but of developing them and enhancing their potential.

### 2.3.4 The city port of the twenty-first century: a new port-city identity

However, the competitiveness of ports no longer depends solely on their own infrastructure and equipment. While in the past many ports were capable of adapting to the requirements of a changeover from an agricultural to an

industrial economy with a considerable degree of autonomy and independence from the city, if they are now successfully to take up the challenge of the new changeover and the development prospects it holds out, a mutual commitment of port and city is required, a joint gesture on behalf of the sea.

Information networks (telematics, television, satellites), high-speed motorways and airports, etc., are gradually shaping the economic infrastructure of the twenty-first century. On this foundation a new spatial scenario has begun to emerge on the world scale, shaped by a physical and non-physical network by which cities are increasingly interconnected and which facilitates mobility, as well as the fluidity and speed of interchange.

In practice, *in the new world economy port metropolises - and not mere ports - are destined to become essential nodal points in these traffic networks, i.e. locations that possess efficient tertiary, commercial and financial capacities. As free zone, business, distribution and processing zones, the maritime nucleus requires bankers, insurers and information and research services, in short, a whole range of services which are not directly port services and which can be provided only by a genuine metropolis. 22/* Consequently, it is sophisticated tertiary functions that will decisively influence the competitiveness of ports.

While throughout history the sea has confronted city ports with a challenge in surmounting which they have derived countless benefits, nowadays the contribution by cities to transforming ports into something more than mere transit points for merchandise will determine not only the durability of port activities with higher value added, but their very presence in the new spatial scenario, and thus the possibility of participating in the new growth opportunities it will afford.

Consequently, the durability of city ports calls for a new commitment between ports and cities. Such a commitment requires the reformulation of the existing parameters of their relationship and understanding, the alteration of predetermined equilibria and the construction of a new framework for their relationship on the basis of a new port-city identity whose aim is to revitalize them as maritime and trading entities.

### Chapter III

#### CHANGES IN PORTS AND STRATEGIES FOR SUSTAINABLE DEVELOPMENT

For ports, attempting to control and overcome the crises and changes which have already begun to take effect as a result of the changeover from an industrial economy to an economy based on information and knowledge, while continuing to play a role in the new emerging economic and spatial scenario, first of all entails facing the fact that the future is not what it used to be and that, against this background of rapid and profound change, ports will cease to be what they are now.

With durability under threat, sustainable development means avoiding exclusion from the emerging new system which will radically exclude and segregate those economic, social and geographical sectors that are incapable of creating value or of being improved and of doing so without unduly jeopardizing the environment. <sup>23/</sup> Thus, the first step is recognizing the need to change. However, it is not sufficient to assimilate this change in attitude; it is also necessary to define strategies and clarify priorities whose implementation does not jeopardize the port's future. For many ports, the new opportunities require them to go beyond the mere *transit function* and to become *logistical centres* as technology, infrastructure and market prepare themselves for this.

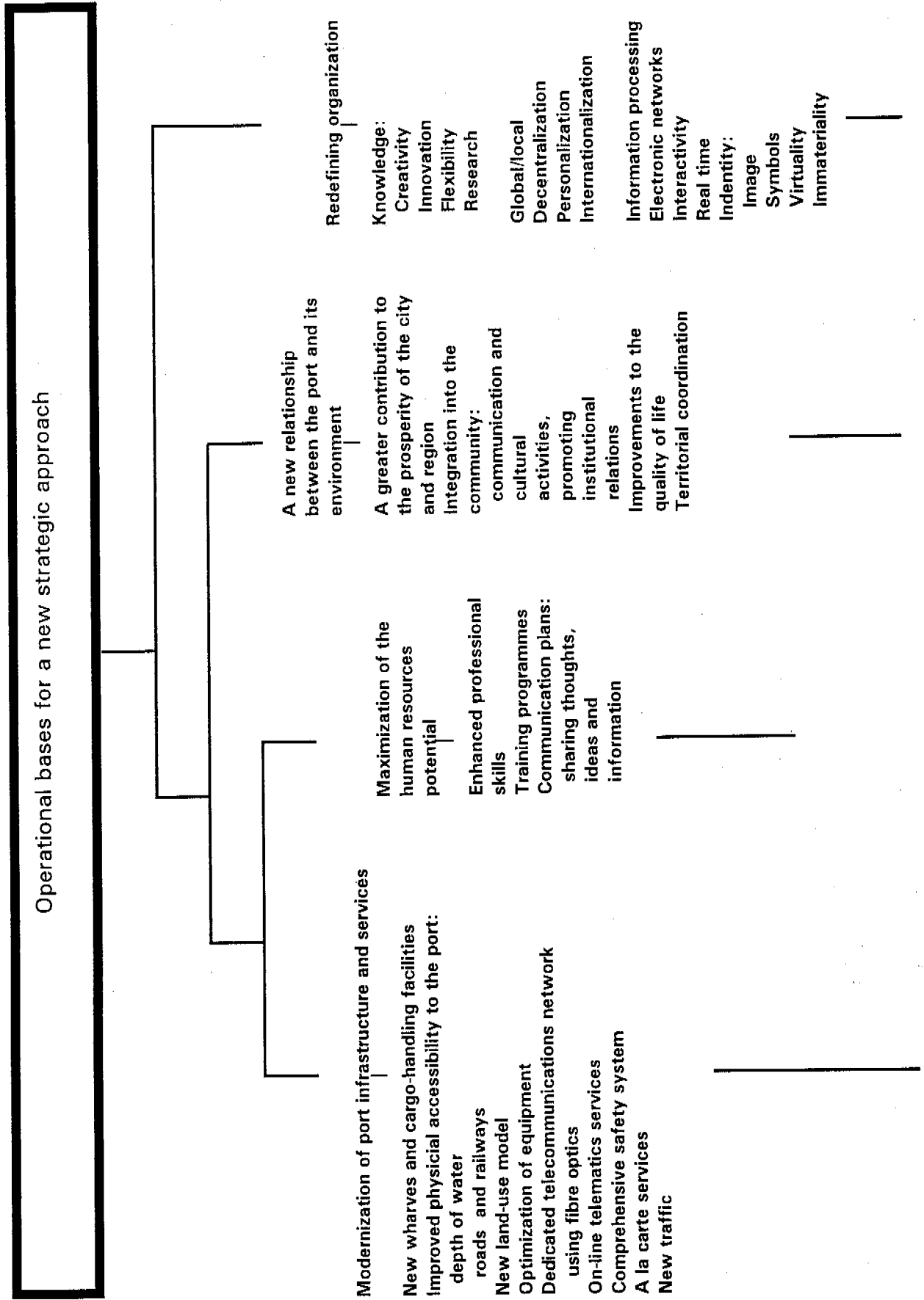
Implementing this new strategy necessitates taking a number of decisions affecting both the port's *organization* and its *projection and external positioning*. <sup>24/</sup> Figure 4 shows the main factors to be taken into account.

#### 3.1 Organizational changes

Ports have to take up at least two challenges. First of all, they have to redefine themselves from the angle of customers' changing needs. Secondly, they have to understand that their success, dynamism and productivity will no longer directly depend on a quantitative increase in conventional factors of production, but on the application of knowledge and information to the management and provision of their services.

This entails a re-examination of their organization in terms of the management of their overall resources to achieve their aims and objectives; an organizational change affecting each and every one of the elements that constitute a port as well as their interrelationships.

Figure 4





### 3.1.1 Modernization and optimization of material resources

One of the basic consequences of the change which has begun to take effect in many ports is the disparity between their actual capability and demand, as a result of the joint action of two factors. The first of these concerns the availability of a range of port facilities which, on account of their technological obsolescence (limited depth of water available, storage area, etc.), or their urban location (pressure from urban activities which restrict and determine their operation as ports) have either ceased to be of use for commercial traffic or handle a very limited volume of traffic; these circumstances lead to a reduction in the port's operational infrastructure. Such ports should be expanded by the addition of areas made available by the reconversion or, in more drastic cases, the dismantling of certain activities such as steelmaking and shipbuilding which were located in the industrial city-port.

The second circumstance concerns the need to respond to the new requirements imposed by international maritime trade and transport (investment in new wharves with suitable berths, availability of areas for logistical and administrative activities, provision of data-processing and telecommunications infrastructure, etc.), and to another set of demands generated by factors that are not directly involved in the port economy but which it is impossible to disregard (leisure, cultural and sporting activities connected with the sea, etc.).

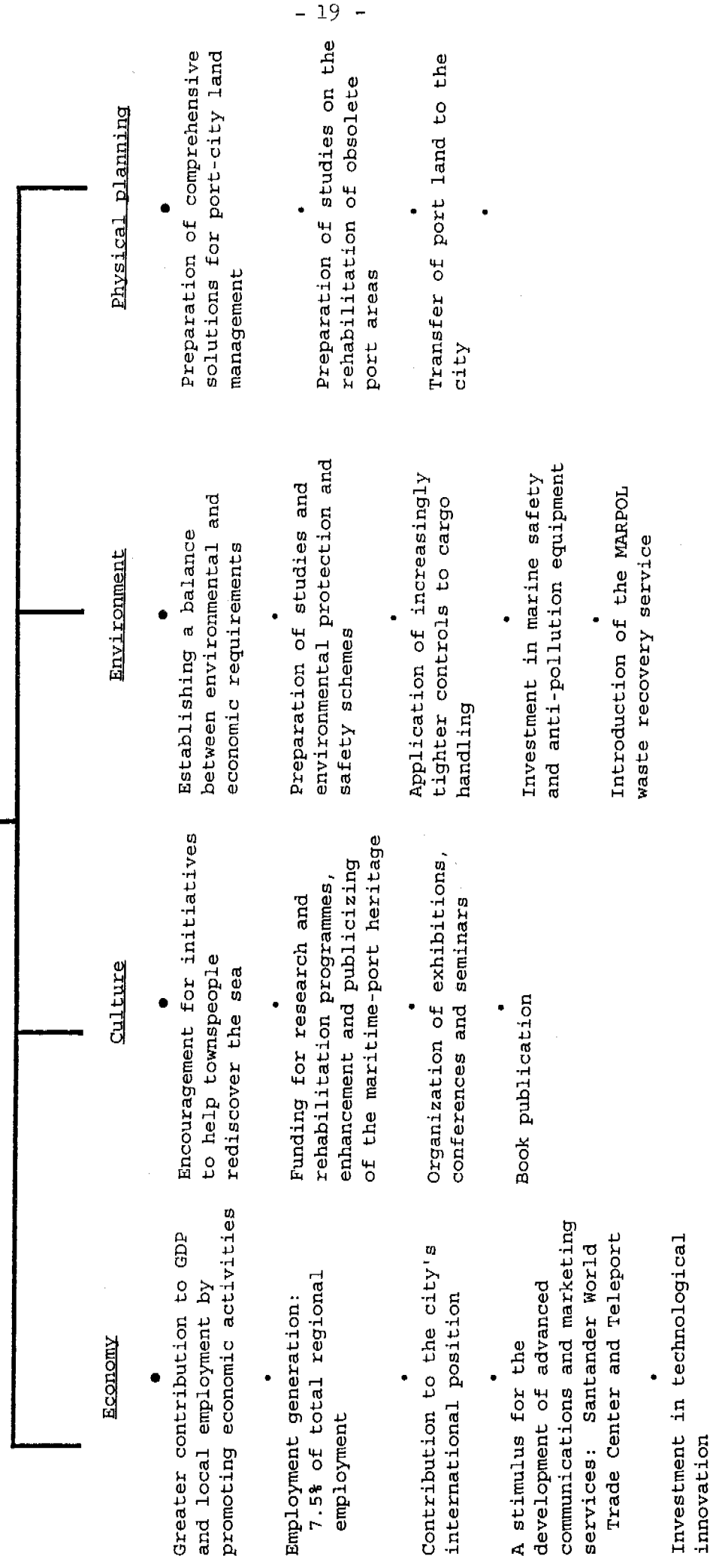
As a result, many ports must make good infrastructure deficiencies of varying degrees, as well as poor use of space which in any case calls for a new approach and a reorganization of the port area. The port's changeover to being a logistical centre requires a physical and conceptual re-examination of the spatial dimension of port activities, with as its corollary a reorganization and restructuring of space to respond to the new demands of international maritime trade and transport, to the problems of linkage and coexistence with the urban environment and the revitalization and promotion of the city's maritime role, by fostering the development of new maritime activities. Examples of the major transformations required in ports are the expansion of the Barcelona free zone involving the diversion of the Llobregat river, the expansion of the port of Antwerp on the right bank of the river Schelde, on land belonging to other communes, and the establishment of London's port activities at Tilbury, nearer the mouth of the Thames, followed by the conversion of the old docks into a commercial and residential area. Figure 5 shows the main elements of the strategy adopted by the port of Santander.

### 3.1.2 The "informationalization" of port activity

Satisfying the new demand and increasing the port's productivity and competitiveness also require constant and increasing application of information and knowledge to port activities as a whole; from this angle, a profound review is required both of the services offered by the port and of their management and administration.

Figure 5

Constructing a new port-city identity



Examining existing systems for the provision of services in order to offer improved quality, speed and prices by incorporating into them information and knowledge does not solely mean computerizing the different port tasks. "Informationalization" <sup>25/</sup> involves a thorough review of the design and use of systems currently employed in spheres such as navigation aids, port control and safety methods and cargo loading and unloading operations, as well as the improvement of efficiency and output, administrative and economic management of the port, procedures for contracting and invoicing for services, purchases and supplies, etc.

The use of information and communications technologies in conjunction with the application of knowledge not only makes it possible to rethink port management and services, but also opens the way for the design and development of new services whose fundamental purpose is to optimize the physical, documentary and commercial management of merchandise and vessels during their stay in port, thereby enabling new sources of income to be created for the port.

### 3.1.3 A new approach to port labour and employment

As already indicated in 3.1 above, productivity is no longer directly determined by the quantitative increase in the labour factor. One of the most striking features of ports in recent decades has been the considerable reduction in manpower. <sup>26/</sup> Consequently, while reviewing and adapting port management and services, it is necessary to re-examine the concept of labour and employment at three levels at least.

First of all, the need to provide services to order makes the formulation and implementation of a new labour structure indispensable. A significant number of professions traditionally linked to port activity have begun to experience a crisis, while at the same time demand for new kinds of professional skills in emerging areas of port activity has arisen. Port workers are acquiring the range of skills necessary to perform a variety of tasks.

However, the change affects not only the design of the labour structure. With the "informationalization" of port activity, human capital is becoming an essential factor of production to the extent that it is capable of creating value (creative contribution to improving the quality of services, information handling capacity and the application of knowledge to information management, sensitivity to changes in market needs, etc.). A policy that aims to *maximize the potential of the human resources* of the port requires, *inter alia*, an improvement in the professional skills of employees through continuous training programmes; the introduction and development of communication plans to facilitate the sharing of thoughts, ideas and information; a change in the style of management in systems of rewards, etc.

In conjunction with these issues, a re-examination of the concept of port labour is inevitable. One of the consequences of the use of new information and telecommunications technologies is to accelerate the trend towards the breakdown of labour processes whose unity is reconstituted through telecommunications networks. <sup>27/</sup> The organization of work in terms of service

and market lines, the creation of semi-autonomous units, the development of subcontracting, the increase in temporary and part-time work and the development of teleworking are phenomena which have already begun to develop significantly in ports.

#### 3.1.4 The extended port: the new organizational dimension

In the industrial production field, companies practising mass production are characterized by strict functional separations, with workers, machines and technology rigidly specialized and thinking separated from doing. Companies practising mass customization, on the other hand, are characterized by integrated functions with movable boundaries, with workers, machines and technology flexibly specialized and thinking integrated with doing. Modern car production, in which cars are manufactured to each client's specifications, is an example of mass customization.

Success in this modern form of industrial production requires an integrated organization in which each function, unit and staff member is focused on the client and tasks that do not generate value-added are eliminated. All productive functions extend to clients, with different levels of interaction, depending on each market's needs of the moment. <sup>28/</sup> For this reason, many writers suggest that the bureaucratic, hierarchical form of organization used by most companies is now obsolete. They suggest that the organizational structure of the twenty-first century will have to take the form of a network in order to be able to compete.

In the area of maritime port activities, these changes will take place at three different levels. The company (port authority and operators) will change from a closed hierarchy to an open organization working as a network; technology (port facilities and services) from a transport centre to a logistics centre; and information systems (EDI and communications) from a central server to network systems, open to communications with other networks (INTERNET).

During the 1950s and 1960s some traditional ports which had previously only been transport centres were converted into industrial and distribution centres. During the past decade, some of the more dynamic ones have begun to offer an information systems infrastructure (infostructure) together with a physical infrastructure, thereby becoming veritable platforms or logistics centres for international trade. These three types of port may be considered as being first, second and third generation ports. <sup>29/</sup>

There is no reason for the nature of the cargo to change during transport, but it may be subject to consolidation, load splitting, labelling, long-term storage and other similar operations. All these operations, typical of a distribution centre, require the integration of considerable flows of information on production, transport and distribution of goods, which calls for the use of EDI. Suffice it to note that the information systems of freight forwarders, agents and Customs offices must be integrated in order to streamline cargo reception and dispatch in many distribution centres.

The result is a change from a port organized around a physical infrastructure used only for transport to a port that is a logistics platform oriented towards the final user. The port becomes extended, in order to be

more cooperative and interactive with the various agents, operators, freight forwarders and companies in the transport chain, for which reason it is beginning to be called the Extended Port, the purpose of which is to overcome the lack of continuity in the sea-land interface. A new concept is emerging: the port is becoming extended to the final client, to the consignee of the merchandise, who is spared the task of storing it at the point of destination. This is clearly occurring with the logistical distribution facilities located in ports that deal with the transport of cars.

### 3.2 External projection and positioning

Although the external projection and positioning of a port is not a separate issue from that of its organization, in the interests of clarity these aspects are discussed here separately from the other components of the sustainable development model. External factors include the port's relations with its surroundings and range from commercial action to promote and sell port services to decisions to establish procedures and channels for improving the port's relations with its social environment, including its links with the city.

#### 3.2.1 Creating a favourable atmosphere for trade

Adam Smith said that a society's economic development (the cause of its wealth) depended on the size of its market and the interchange generated by its trade. From this viewpoint, ports and shipping have become essential components of trade, linking producers and consumers, facilitating market supply and thereby giving rise to a close and permanent link between trade, ships and port infrastructures.

Economic integration, together with the increase in flows of goods due to the emerging global economy, is giving new impetus to trade-related activities. Many port cities therefore have an excellent opportunity to revitalize their role as trade centres. From this viewpoint, the port becomes an exceptional energizer of trade by propelling and/or supporting the development of advanced marketing and communications infrastructures and services: teleports, world trade centres, and trade points.

##### 3.2.1.1 Teleports and world trade centres

In the past, ports fostered the development of cities as international business centres. Later on, airports were built in the world's most important cities. In the decades to come, teleports will help determine the most important cities in the world hierarchy. Teleports are communications centres with clearly international scope, which is why they tend to be located in areas with a long tradition of international trade. It is no accident that many port metropolises throughout the world are now in the process of setting up teleports.

This is because cargo needs to be consolidated, handled and dispatched in the shortest time possible. In terms of information flow, this equates to the need to group, transport, integrate, load, pack, and send the documents produced in real time through EDI, with teleports then required for the cargo to arrive at its destination.

There are various definitions of the teleport; Antonio Trueba (President of the Madrid and Seville World Trade Centres) describes it broadly as a gateway to a satellite or other means of long-distance communication which, through an appropriate distribution network, provides a service to large urban centres, consisting of new real estate projects developed for that purpose and of existing projects and forming a comprehensive regional development project. In this definition, the following should be emphasized:

The satellite, as a communications vehicle;

The network, as a distribution infrastructure;

The territory or area, based on new or existing real estate projects.

In many cases world trade centres precede teleports, encompass them or help them develop within or near their own location. The world trade centre's reason for existence is to facilitate international trade by concentrating business and services in one place. Another of its basic objectives is to ensure a greater share of world trade for small and medium-sized businesses.

The teleport is the basis for the development of the logistical centre. In particular, experience with ports has indicated the following sequence: (a) sea/land transport; (b) distribution centre; (c) logistical centre. Ports are therefore at the highest levels, where physical point-to-point or door-to-door links become less important than information links.

At the microeconomic level, the teleport provides parties to international trade with many advantages. It enables shippers to check cargo at various points and take timely decisions to maximize their income from every voyage their ships make. Manufacturers can use telecommunications services to maintain minimum stocks for just-in-time delivery to their clients from the distribution centre. Merchants can identify market opportunities more rapidly and act on them rapidly in order to make a profit. Finally, shipping agents, or other interested parties, can use the system to monitor ships, cargo or containers.

We have the opportunity now to plan the port cities of the next century from a sustainable development perspective. A city-port synergy will be needed to develop port-cities and determine their position in local, regional or world networks.

### 3.2.1.2 UNCTAD trade points

Obtaining a larger share of international trade is a prerequisite for development, according to the ministerial statement to the United Nations International Symposium on Trade Efficiency, held from 17 to 21 October 1994 in Columbus (Ohio, United States of America). The Symposium agreed to launch the Global Trade Point Network (GTPN), as the first example at world level of the positive role that can be played by the information highway in trade and development.

UNCTAD defines a trade point as a trade facilitation centre, where the participants in external trade transactions (such as Customs offices, foreign

transport and insurance companies) are grouped together under the same physical or virtual roof in order to supply the services needed for trade transactions at a reasonable price.

Trade points serve as "single windows" for international trade. One of their most important objectives is to bring electronic trade into widespread use, based on the principle of equal access by all countries to systems that are compatible with United Nations recommended standards. Many cities in countries that are assuming trade point status are using existing world trade centre platforms.

The goal of trade points is not only significantly to reduce the costs of trade transactions, projected at \$100 billion per year by the year 2000, but to ensure sustainable development for cities and, in the case of port cities, for their port platforms.

### 3.2.2 Making a port into a city and a city into more of a port

As stated earlier, changing ports into essential nodes of the networks for circulating tangible and intangible commodities in the emerging new economic and spatial scenario no longer depends only on the port itself, and cannot easily be carried out independently of the city. Successfully contending with this new process of change and the development expectations it raises, requires a rethinking of port-city relations in economic, spatial, environmental and cultural terms. (See Fig. 6.)

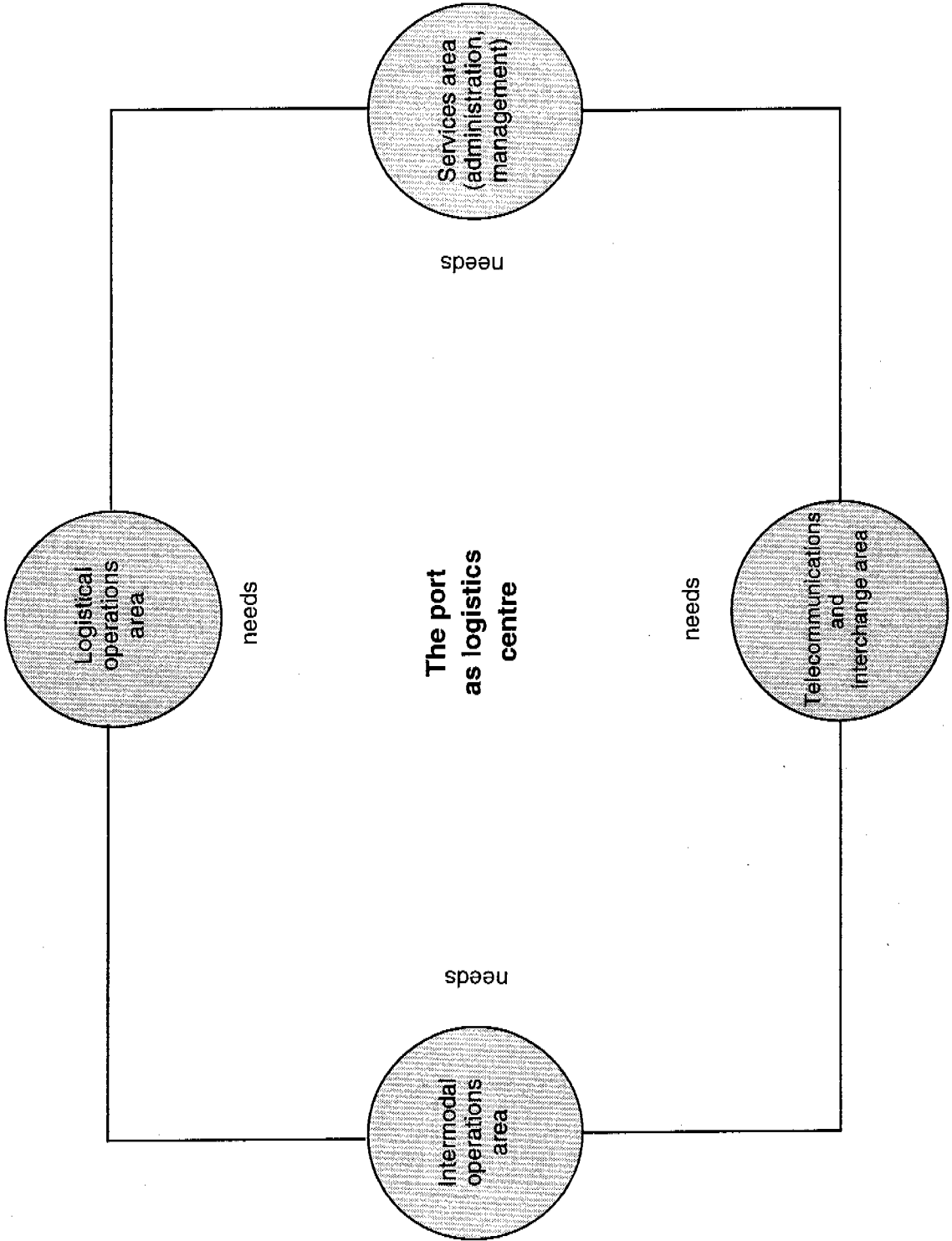
#### 3.2.2.1 The economic dimension

There is no doubt that ports have always contributed to the prosperity and wealth of the areas in which they are located. Over the years the port area has become an exceptional resource with a significant potential for boosting and developing a large number of economic activities (production, consumption and trade) whose impact on the life of the city has been, and in many cases still is, decisive.

The growing globalization of the world economy, the liberalization of trade in goods and services, new technologies, etc., are helping significantly to change the role of ports as international trade and transport nodes, so that their traditional *transport* role will have to expand to include *distribution* (storage, consolidation, stocktaking, etc.) and *data processing*. This process of transformation provides an exceptional opportunity not only for enhancing a city's international trade and transport related activities, but also for other activities not directly port-related (financial services, research, consultancy, etc.) but which make a decisive contribution to the establishment of the port as a logistical centre.

In addition to the contribution made to the city's wealth by the port's trade-related activities a number of activities are steadily acquiring increasing economic importance in response to a growing social demand. Water sports, leisure activities based on the enjoyment of the seashore, development of the maritime heritage in both its historical and cultural aspects, etc., are emerging as economic sectors of interest to maritime cities, and can play a significant role generating jobs and income.

Figure 6





### 3.2.2.2 The spatial dimension

Ports and cities have not only had the ability to expand their territory throughout history, but have arranged and rearranged the utilization of their space in order to keep pace with their needs. Because each has its own sphere of competence, they must initially cooperate in devising compatible growth systems that do not jeopardize their future physical expansion needs. To that end, the concept of servitudes must be kept in mind. Railways, airports and high-tension electrical networks are some of the infrastructures that have a transition area between their own boundary and that of activities with which they are functionally incompatible. Given that most traditional port activities clash with many urban activities, deciding how to define these transition zones within areas where spaces reserved for ports and cities coincide is crucial to a sustainable development policy.

Next, the deficiencies of infrastructure mentioned in paragraph 3.1.1 should be dealt with by drawing up planning proposals for the port area that do not take only port-related needs and requirements into account. In this way, the port assumes new responsibilities towards the local population.

A complete reorganization of the port area should thus be undertaken to provide mutual benefits to the port and the city. The transfer, leasing, exchange, closure, reversion and even sale of port lands considered to be uneconomic are some of the measures that might help resolve certain specific problems (demands for industrial space, lack of equipment, decongestion of urban roads relieving urban pressure on certain operational port areas, etc.). From an overall perspective, however, these spatial reorganization processes provide the best opportunity for revitalizing the city's maritime role and redefining it by developing sea-related activities. 30/

### 3.2.2.3 The environmental dimension

In addition to resolving spatial problems, a sustainable development strategy for ports involves seeking ways of protecting the environment that are geared to a port's competitiveness. 31/ Although until a few years ago the environment of a port was considered merely to be an economic support especially suited to the development of port and industrial activities, these areas have begun to be considered from an environmental point of view and have consequently become ecologically privileged areas. Both shipping disasters (oil spills in coastal areas) and a port's daily operations (moving of dangerous goods, number and size of ships, loading and unloading operations, etc.) have an ecological impact against which prevention and control measures need to be instituted, in an attempt at least to minimize their consequences.

In addition to the direct risks of harm to the environment, there are other risks no less important to the quality of community life. Noise, heavy traffic on urban roads, the visual consequences of a gradual deterioration of the landscape, etc., are problems directly associated with the image of the port city and which, if not properly resolved, may have a serious effect on the port's efficiency in the medium term.

A successful resolution of these environmental problems, on the other hand, will probably bring high value-added to the activities of port cities by raising the quality of their natural and urban environment.

#### 3.2.2.4 The cultural dimension

A key element in forging the cultural identity of the peoples and communities settled along the coast has been the benefits associated with a close, permanent relationship with the sea, and the maritime role they have played throughout history.

In this context, ports have been a strategic enclave, meeting the challenges of the sea by coordinating, organizing and facilitating the development of a wide variety of activities aimed at exploiting the sea's potential. Besides bearing most of the responsibility for society's maritime activities, however, ports have fostered the development of an affinity with the sea capable of generating concepts, values and ways of viewing the world that influence the lives, perceptions and attitudes of the communities in which they are located. As a result, ports are essential to the establishment and development of the maritime potential of society, the bearers and transmitters of a specific material and non-material heritage which at the same time is interrelated with and integrated in that of the international maritime community.

In recent decades, many industrial port cities have been turning their backs on the sea, losing not only contact with a culture, activities and traditions that moulded their history, but also, much of their capacity for approaching the twenty-first century creatively. In order to establish a new port-city identity in addition to revitalizing the community's maritime role efforts should aim at integrating the port into society.

#### A. Revitalizing society's maritime role

One of the most significant features of the maritime cultural heritage is its enormous wealth. Society's ongoing contact with the sea throughout its history has generated a rich heritage and ample material, social and spiritual evidence in both tangible (buildings, wharves, shipyards, lighthouses, instruments, machines, tools, boats, etc.) and intangible (knowledge, professions, institutions, technologies, even artistic creations, languages, clothing and recreational activities) forms.

Since all man can do is maintain a rational and positive attitude towards what he understands, using ports to foster a renewal of the relationship between society and maritime activities through initiatives aimed at the recovery, enrichment and dissemination of his cultural heritage, is one way to stimulate ideas and small or large changes in attitude at both the individual and collective level and to work towards a new identification with the community.

B. Integration into the community

To consolidate a sustainable development strategy for ports, however, it is not sufficient to encourage a change in society's attitude towards its maritime-port activities. The ports' traditional tendency to withdraw from the community must also be corrected. To bring about a new relationship between ports and communities, ports must adopt a more open and permeable attitude that favours the establishment of smoother and more enriching relations with the communities in which they are located and the institutions that represent them. At the same time, however, ports must make a concerted effort to strengthen their presence in community life, take on a genuinely public dimension and choose their area of social influence. To that end, they must participate actively in city life and attain a higher degree of commitment to it.

## Chapter IV

### CONCLUSIONS AND RECOMMENDATIONS

The material discussed in the previous chapters indicates that port-city relations are influenced principally by the three following factors:

- (a) The area in which activities have taken place, concurrently or separately, throughout their historical development;
- (b) Trade, which, because it emphasizes the supply and/or demand markets differently, has a definite influence on vital urban and port functions;
- (c) Technological innovations, including improvements in the quality of life.

In addition, the integration of port-city relations requires a change of approach, based on a holistic view that emphasizes interrelationships rather than linear, cause-and-effect connections and processes rather than separate events. The efforts and work of the International Association Cities and Ports on these topics should therefore be supported.

The idea that port-city relations are dynamic and complex is a very important one and means that the same action has radically different effects in the short and long terms. For example, if a residential area is developed alongside a port area so that flows of goods have to use shared highways and/or streets, there may initially be a balanced relationship between the urban and port areas, provided traffic is not too dense and the goods involved are of the clean or non-polluting type. Subsequently, when traffic becomes heavier and the goods are replaced by other more polluting ones, and the inhabitants of the urban area naturally come to demand a better quality of life, there will tend to be a conflict or imbalance in the urban-port relationship.

The sustainable development approach therefore requires viewing port-city relations as a point of intercession or balance in achieving the following three general objectives: (a) environmental integrity; (b) economic efficiency and (c) quality of life. To that end, actions are recommended that will:

#### Avoid incompatibility between urban and port uses

Areas of servitude or protection will have to be defined. For example, the port area itself should be surrounded by an area of logistical and industrial port activities that will facilitate the transition to urban residential areas;

#### Facilitate the development of international trade networks

Efforts should aim at developing world trade centres, teleports and trade points. This involves providing the port-city nucleus with the "brain" needed to develop trade;

### Facilitate the use of the waterfront

Areas that are obsolete in terms of actual port activity can be used for leisure, sports and maritime culture activities.

These general measures should be supplemented by other, more specific ones more geared to the actual situation of cities and ports and based on the following principles:

#### Internalization of costs

The "polluter pays" rule should apply;

#### Equity

Poverty and lack of equity contribute significantly to environmental deterioration and political instability. Equity must extend to the distribution of the physical and natural capital and of knowledge and technology;

#### Subsidiarity

Decisions are taken at different levels, depending on the nature of the matters in question. Subsidiarity assigns priority to the lowest decision-making level, nearest to the problem to be solved;

#### Confidence

This encompasses two basic elements: first, easy and timely access to information for all those involved and second, public participation in the decision-making process. This is essential for the formulation and practical implementation of environmental and development policies and is also important in minimizing the risk that trade policies will be slanted in favour of inefficient producers;

#### Cooperation

Sustainable development requires international systems of cooperation to be strengthened at all levels, including the environment, development and trade policies. The most desirable forms of international cooperation will avoid conflicts through international efforts on behalf of development, protection of the environment and the stability and development of the international trade system.

#### Notes

1/ Sustainable development in ports, UNCTAD/SDD/PORT/1, 1993, para. 2.

2/ Davis, Stanley M. Futuro perfecto. Tiempo, espacio y materia. Las variables estratégicas del futuro, Barcelona, 1988, p. 187.

3/ See, for example, Basu, D.K. Ed., The Rise and Growth of the Colonial Port Cities in Asia, Berkeley, United States of America, 1983; VVAA, Puertos y fortificaciones en América y Filipinas, Madrid, 1985; Broeze, F., Ed., Brides of the Sea: Port Cities of Asia from the 16th to the 20th Century, Honolulu, United States of America, 1989; Knight, F.W. and Liss, P.K., Eds., Atlantic Port Cities: Economy, Culture and Society in the Atlantic World, 1650-1850, Knoxville, United States of America, 1991; Broeze, F., "Los sistemas portuarias y puertos en el Océano Indico y Asia Oriental en los siglos XVIII-XX", in Coloquio sobre el sistema portuario español en los siglos XVI-XX, Madrid, 1995 (in press); and Hoyle, B., "Gateways to the Sea: the Role of Port Cities in the Development of East Africa", Fifth International Conference on Cities and Ports, Dakar, Senegal, 1995 (in press).

4/ For defining the periods of the three great economic ages described here, we have used the chronology proposed by Stanley M. Davis in "El tiempo y su impacto en la cadena logística", XIV Jornadas de logística, 2-3 June 1992, p. 2. In this article, Davis establishes the following periods: agricultural economy (prior to 1700); industrial economy (1760-1950); information economy (1950-2020); biological economy (since 1970).

5/ In the case of Spain, of great interest in this regard are the contributions made by Santos Madrazo in El sistema de transportes en España, 1750-1850, Madrid, 1984, 2 vol., and in several articles compiled in "Historia de las comunicaciones en España", MOPT: Revista del Ministerio de Obras Públicas, Transportes y Medio Ambiente, July-August 1994, No. 422.

6/ Michaud, Jean-Luc, "La ordenación de zonas litorales", Ed. Institutos de Estudios de la Administración Local, Madrid, 1981, p. 93.

7/ In the case of Spain, until almost the mid-nineteenth century the ports were administered by consulates, trade boards, city halls, councils and other organs at the State level, under specific rules drawn up for each of them. In Alemany, Joan, Los puertos españoles en el siglo XIX, Madrid, 1991.

8/ At this stage the definitive forum of national markets took shape accompanied by spectacular growth in international trade. See, for example, Tamames, Ramón, Estructura económica internacional, Ed. Alianza, Madrid, 1987, pp. 28 et seq.; Belshaw Cyrils, Comercio tradicional y mercados modernos, Ed. Labor, Barcelona, 1977, pp. 109 et seq.

9/ Claval, Paul Geografía Económica, Ed. Oikos-Tau. Barcelona 1908. p. 229.

10/ These changes in maritime transport, which begin with the birth and development of steam navigation, have been described by Joan Alemany in Los Puertos Españoles..., op. cit., p. 79 et. seq.

11/ Toffler, A. La Tercera Ola. Ed. Plaza y Janés, Barcelona, 1980, p. 67.

12/ Terán, F. El Problema Urbano. Barcelona, 1982, p. 22.

- 13/ Castells, M. et al. El desafío tecnológico en España y las Nuevas Tecnologías, Ed. Alianza, Madrid, 1986.
- 14/ Toffler, A. El Cambio del Poder. Ed. Plaza y Janés, Barcelona, 1990, p. 48.
- 15/ Davis, Stanley M. Futuro Perfecto ... op. cit., p. 157 et seq.
- 16/ Davis, Stanley M. Futuro Perfecto ... op. cit., p. 51.
- 17/ Thurow, Lester. La Guerra del siglo XXI, Ed. Vergara, Buenos Aires 1992, p. 57.
- 18/ Granger, José R. "Nuevas Tecnologías y Servicios en España". In Información Comercial Española, No. 719, July 1993, p. 62.
- 19/ Granger, José R. "Nuevas Tecnologías y Servicios ..." op. cit. p. 60.
- 20/ If current trends continue, the increase in the number and range of products in the near future will be striking, since according to OECD, 50 per cent of the products that will be in use in 15 years do not yet exist. In Schmidheiny, S. Changing course. A global business perspective on development, The M.I.T. Press, 1992.
- 21/ UNCTAD, "Port marketing and the challenge of the third generation port", TD/B/C.4/AC.7/14, Geneva, 1992.
- 22/ Baudouin, Thierry, "Le Role Essentiel des Metropoles Portuaires dans l'Internationalisation de l'Europe". Second International Congress "Villes et Ports". Barcelona, December 1989, p. 2.
- 23/ See note 1.
- 24/ Strategic planning for port authorities. UNCTAD/SHIP/646.
- 25/ Castells, M. "Sociedad de la información: diez theses", in Temas para Debate No. 5, April 1995, p. 65.
- 26/ Between 1970 and 1982 manpower fell by 39 per cent in Antwerp and 78 per cent in Liverpool, and by 11 per cent in Hamburg between 1973 and 1982. In "New cargo handling techniques", A.D. Couper, ILO, Madrid 1987, pp. 24-26.
- 27/ Castells, M. Sociedad de la información: diez tesis. Op. cit., p. 66.
- 28/ Pine II B. Joseph, "Mass Customization. The New Frontier in Business Competition", Harvard Business School Press, 1993.
- 29/ Port Marketing and the Challenge of the Third Generation Port, UNCTAD, TD/B/AC.7/14, 1992, op. cit.

30/ Baudouin, T.; Collin, M. "Le rôle des villes portuaires dans la façade atlantique française", Journal de la Marine Marchande, 28 May 1993, p. 1,245. In this article the authors give a few examples (Bordeaux, Brest, Le Havre) where operations of this type have begun.

31/ Especially interesting reading on this question is an article by Lemaire, Olivier: "Villes Portuaires, Acteurs de l'environnement", Journal de la Marine Marchande No. 3838, 9 July 1993, pp. 1602-1603.

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