

The post – war port industry development models: the effects on the economic development of the port’s hinterland.

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ABSTRACT

The economic development of the port industry that followed the Second World War was based upon two economic theories trends. Until the late 70’s the model based on Keynesianism forms the basic idea for ownership, infrastructure, investment, pricing policy and role of ports. Since the early 80’s Neoliberalism is adopted as a new model of development oversetting what was taken for granted until now and employing a new basis for the port production. Within this framework container ports are the spearhead. The reformed container port industry focuses on container terminals as links in the logistics’ chain with effectiveness in port production and in the integrated logistics’ chain being their main aim. For this purpose private investment and private port operators come forth.

This paper tries to examine whether and in what ways the modern port affects the economic development of its local (port city) or broader (region) hinterland. How is this accomplished in the age of globalised economy?

Key Words: port industry, port reform, localisation, regionalisation, globalisation.

1. Introduction.

Ports today operate in a newly framed globalised environment where combined transport, logistics, information flows and innovation, concentration and integration lead the market and each business in it.

The world trade structure has changed since world production has moved from the developed west countries to the developing ones and mainly to Asia, changing the trade flows. The industrial relocation was followed by a boom in world production to which shipping reacted increasing the tonnage supply and maximising cargo unitisation (Heaver *et al* 2000). The ship gigantism phenomenon initially appeared in bulk shipping and soon affected the container ships, a still developing process.

The changes in the port production were rapid regarding the technological change that is the relationship defining the port production function, meaning the proportion of production factors used in the port operation. In this way ports turned from labour intensive to capital intensive businesses. Despite the changing production process, ports still serve the market with the same product: cargo transfer from sea to inland transport modes and vice – versa (Pardali *et al* 2005). Within this frame of technological change and need for massive production, the port industry goes through transition.

Modern needs for cargo transport and handling entailed an integrated transport chain. Containerization contributed further in this as it ensured a continuous transport chain from the producer to the consumer, using a multimodal system of road, rail and sea transport. Complementarity among the different transport modes offered quick, economic quality services. The monopolistic power of certain transport means in the past, affected negatively the product distribution because of the high transport cost that led to high product pricing that eventually damaged their competitiveness in the global market.

The transport system is organized in a whole through combined transport that runs throughout the chain from the shipper to the receiver and is characterized by fast distribution services and low non – productive capital. The carrier has the responsibility to organize and control the whole operation. (Benson *et al*, 1994).

Facilitating combined transport imposed in a way the necessity for freight centres, where the goods are moved from one transport mode to another. The development of “Container Loading Centres” as sea transport terminals and “Freight Villages” as inland transport terminals were the result of the above process. These centres were the main suppliers for transport services, while ports, inland freight stations and freight warehouses were the main customers for transport companies.

Transport services are of great importance for the world economy, for this contributed to the development of multinational companies, since their production required raw material from one country, warehousing in another and exports to a third one. The part of the logistics operator that handles this complicated process was often assigned to a port or even a port terminal, as it is an important if not the most important node in the logistics chain.

Ports had to deal with the new, enlarged market and the new transport system. They had to remain in the game and to do so they had to earn and sustain competitiveness. Private sector intervention in terminal operations and financing played a great part in port competitiveness (Midoro *et al*, 2005).

The highly competitive environment eventually led to all kinds of concentration, alliances, mergers, acquisitions, horizontal or vertical integration for the port users as well as the port operators in order to keep their market shares from the demand as

well as the supply point of view (Ryoo *et al*, 1999; Pardali 2001; Slack *et al*, 2002; De Souza *et al*, 2003; Midoro 2005). Market liberalisation has actually been a vicious circle for port industry since it is by definition subject to derived demand and has to follow every change that affects it either in the global trade structure or the transport industry.

The emergent question is if in this newly shaped environment the ports hold on their traditional role of impact on the economic development. This paper tries to answer that question, through analysis of ports' transition from the period of state intervention, when the port was a pole for industrial and commercial development and contributed to the development of its local hinterland and region, to the period when the port becomes a highly competitive business aiming at effectiveness and efficiency

2. The Keynesian Model for Port Development.

2.1. The Port's Hinterland.

The port hinterland is defined as the region where the port is radiated with the inland transport roots (road, rail, river, air) and is served by the port for imports and exports conducted by sea. When this region is constricted around the port facilities, the area is defined as local hinterland and port literature wants this form of regional development to be attributed as a "port city" (Fujita *et al* 1996). The hinterland becomes national when the port serves the national trade of a country. The international hinterland is defined by the port's trade with neighbouring countries. In modern transshipment centres, the hinterland goes beyond local or regional barriers and expands in a global level.

In the Keynesian model the natural hinterland was the main determinant for port development, as the carrier chose the port according to the cargo origin and destination.

2.2. Port Policy

The Keynesian state intervention and national planning was the principal policy after World War Two. Within this framework port policy, until the early 80's, is mainly determined by state intervention. The port was usually a national business and served national interests. Ports were located in regions with trade flows and port operations served the local area. Businesses directly or indirectly related to port production were located in the area around port facilities. Port operation as well as related operations developed with a tendency to agglomeration, rendering the port a pole for industrial and commercial development, always related to ships and cargo.

The positive impact of business agglomeration and multiplier effects, sustained the public ownership of status in the port industry, as well as public financing of port infrastructure, rendering it a public good subject to governmental or municipal subsidization.

The model was in general based on state intervention and its administration imposed public Port Authorities that undertook investments mainly for regional economic development purposes. This criterion also determined port infrastructure pricing (a model based on the equation: Marginal Cost=Price Level, where emerging deficits were fully defrayed by governmental subsidies) forasmuch as there was a conviction that port infrastructure itself could lead to increasing employment and prosperity in the region (McCann 2001).

2.3. Operations' Agglomeration in the Port Region – The Port as a Pole for Development.

It is suggested that the greater impact in the economic development of the local community stems from the location and development of industrial businesses in the port region. The port region attracts the development of industries related to ships, such as shipyards, ship repairing and scrap businesses, as well as industry related to freight processing. In general, industries attracted are port – oriented.

There has been an effort to classify the port – oriented industries. A simple distinction can be made between industrial ports and the industries attracted by the port due to the fact that in this case the port is a centre where population gathers and in this way it constitutes a consuming market itself. The first case regards oil refineries, big factories for metal processing, chemical industries, cement, paper and grain factories. The latter case regards tobacco, food and clothing factories.

The exact location of a factory, regarding its proximity to the dock, depends on the natural characteristics of the cargo and the technology available or necessary for unloading, as well as its removal from the dock. The general rule suggests that the more difficult and expensive the cargo handling, the closer locates the manufactory. By the end of 1960 “Maritime Industry Development Areas” (MIDAs) were introduced. The MIDAs were a result of:

- the rapid development of oil, iron and steel industries,
- the need for greater volumes of raw material (bulk cargoes) and
- the demand for tonnage maximization in shipping in order to achieve economies of scale (McConville 1999)

These new seashore industrial areas were strongly related to the radical changes in sea transport (the adoption of VLCCs and ULCCs as well as gigantism in dry bulk vessels). The technological revolution in shipping industry mainly aimed at reducing the cost of the raw material. Developing MIDAs presupposed deep sea, land available for warehousing, land for the industries' location and a well organised transport system¹ and all this away from the urban areas.

Apart from the industry, the port became a pole of economic development due to additional operations (Table 1). Particularly the businesses attracted by the port are presented in Table 2.

¹ The first generation of MIDAs was based on “Rhinos” model in Rotterdam, beginning in 1958, when industrial and port development was organised, expanding to the sea through Europort and Maasvlakte. Emphasis was given in oil refineries and petrochemical industry. A development scheme for Antwerp in 1955 – 1965, was related to new oil refineries, a great range of chemical and petrochemical industries and car parts assembling. In France the port planning in 1965-1970 ended up to a great scale development of iron and steel industry, oil refineries and petrochemical factories. In Dunkirk the same example regarded oil refineries, chemicals, metal and wood processing, car parts assembling in Havre and iron and steel industry, oil and chemical in Foss.

The great industrial development in Japan and the increasing demand for raw material and fuel imports, led to port planning schemes in 1965 – 1969 and 1971 – 1975. Mizushima and Kashima were the most important MIDAs developed. There had been great reaction in massive industrial development in these regions especially for social and environmental reasons. The reaction combined to the general economic depression held back the development in late 70's.

Table 1: Port – Oriented Services.

Services to vessels
1. VTS
2. Pilotage
3. Towage
4. Mooring
5. Waste management station
6. Water and electricity supply
7. Bunkering
8. Victualling
9. Repairs
10. Dry-docking
11. Agency
Services to cargoes
12. Loading – Unloading to and from vessels
13. Cargo handling from dock to warehouse
14. Temporal storage
15. Cargo handling at warehouse
16. Cargo handling from warehouse to port gate
17. Loading / unloading to and from inland transport means
18. Distribution Centres - Logistics Services (within the port)
Other services
19. Information exchange (regarding vessels and cargoes)
20. Management services on the movement of inland transport, at port
21. Services relevant with the protection of the environment
22. Security services
23. Customs services
24. Legal services
25. Insurance services
26. Banking services
27. Maritime services
28. Other

Source: Pardali, 2001c.

Table 2. Enterprises and organisations located in the greater port area.

Port authorities
Coast Guard stations
Cargo handling companies
Logistics companies
Pilotage companies
Towage companies
Shipping agencies
Shipping companies
Intertransport

Customs
Inland transport companies connected to the port
Insurance companies
Banks
Boarding stations – tourist agencies
Waste management companies
Companies providing legal services
Commercial companies (food – bunkers – spare parts – equipment etc)
Vessel repair companies
Free zones (commercial or industrial)
Telecommunications companies
Other

Source: Pardali, 2001c.

Returns of scale can interpret the development of these areas as they are a function of location and generally known as economies of spatial concentration (Marshall 1920). The main advantage exploited by businesses attracted by the port operation is the abundance and low cost of raw material near the ports (Weber 1909). Marshall (1920) suggested three explanations for concentration: the information spill-over, the local, non – tradable inputs and the tank of local, specialised labour force.

Internal returns of scale are agglomeration economies regarding businesses. Location economies are agglomeration economies concerning economic sectors (shipyards, chemical industries, refineries etc) and urbanisation economies are agglomeration economies regarding port cities (Hoover 1948).

In the pole of development model, investment undertakings or ambitious planning for public investment in a certain region may operate as a pole for local development; in this case port infrastructure may be such an undertaking.

The main matter set by this model is that big economic units or operation tend to affect to a great extent the local development through business concentration dynamics (Perroux 1950; Boudeville 1966; Richardson 1978).

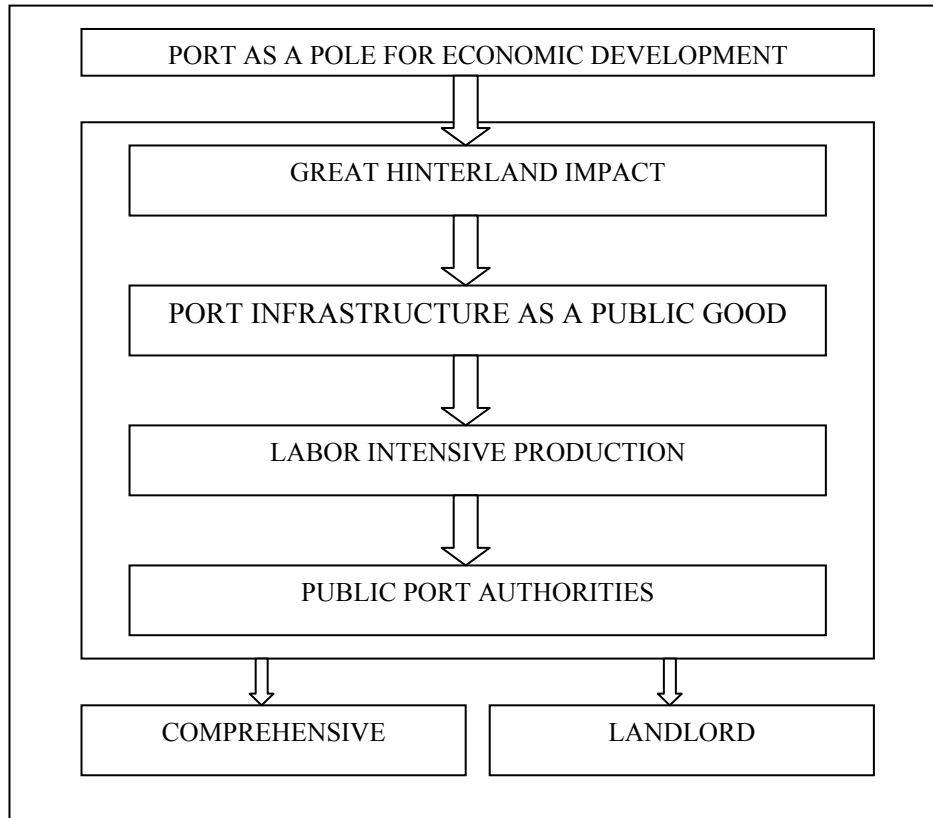
2.4. The Role of the Port Authority

In this model the regulatory frameworks as well as handling operations were controlled by public Port Authorities. The Port Authority (PA) was state or municipal, having full control of port management. The PA determined port production, its pricing, expansion policy, infrastructure and investment. In some cases PA appeared as an independent organisation of public legal ground. In other cases PAs formed in private basis, especially as far as industrial and rail businesses or corporate ports were concerned.

Ports and Port Authorities in this period were subject to two principal ownership models (Figure 1). The “Comprehensive” model where Port Authorities exercised the port management and were responsible for the production of the port product and the “Landlord” model where Port Authorities had the overall control and the responsibility for infrastructure and leased the port product operation to private companies through long – range contracts for infrastructure exploitation, with the obligation that these companies would invest in port superstructure (Goss 1990a, b, c).

The main role of the Port Authority regarded value – added operations maximization and employment growth in the local community and the greater hinterland.

Figure 1. The Keynesian Model of Port Development (Polarisation and Agglomeration Dynamics).



3. The Neoliberal model for Port Development.

3.1. The Port's Hinterland.

In the Neoliberal model port selection lays to the logistics chains. In this way the port's natural hinterland does not weigh as much as some years ago, since the proximity to the port is not a determinant for the port selection process.

Logistics chains choose those transport modes and terminals that offer service with the minimum total cost (for transport and handling). This results in concentration of transport traffic in a number of main ports that produce with economies of scale. The emergence of main ports that serve even more regions, expanding their operation to sub – regional and local scale, need more interstate cooperation between local and global level (Pardali 1997)

3.2. Port Policy.

From the early 80's and on, Neoliberalism constitutes the dominant ideology globally. Individuals and markets are the fundamental elements of the model. Market domination is determining and the main aim of the business is effectiveness. Based on these principles the port role has changed.

Market globalisation, integration and supply chains networks render the port as vital node, with primary objective the effective connection with the other network terminals either inland or sea (transshipment) and special objective, the

competitiveness of the port business, in order to be selected as a node by the integrated logistics chains (Pardali 2001 and 2005).

Initially the need for effective cargo handling in ports became so intense that monopolistic or oligopolistic power held in the past has decreased significantly, since the objective is effectiveness through port competition (inter – or intra – port competition) and privatisation of the port terminals (Pardali 1997; Robinson 2002). The general idea in the Neoliberal model focuses on competitiveness. This objective is suggested to be achieved through private sector participation in port production. In this phase of development an intense trend for privatisation in the world port industry emerges. This reflects in the structure of the port product supply, with port operators organising in a global level (Nooteboom *et al* 2001).

Privatisation, pursuing the effectiveness and competition, eventually appear to lead to high concentration and integration dynamics, as well as network development (Pardali 2001; Slack *et al*, 2002; De Souza *et al*, 2003; Midoro 2005).

3.3. The Port Business unit.

The adoption of the modified version of the “Laissez – faire” conception and the market domination gradually led to state intervention limitation and an effort to attract private sector in the port production process.

The Keynesian model created significant difficulties and inefficiencies in the port industry. Basic reasons explaining this situation were the redundant labour force, the high labour cost, the obsolete equipment, the low productivity and invested capital efficiency, the political, bureaucratic management and the intense state intervention institutional framework in the operation of the port industry.

This image was not compatible with the new requirements of the world trade, the integrated transport systems and the logistics chains that needed operational effectiveness. Specifically, while the transport system required effectiveness (fast, accurate, safe, low – cost service), the majority of ports were unable to respond due to the slack described above.

Liberalisation and deregulation of the port industry tried to overcome the abovementioned problems by:

- Attracting private capital for financing new investment schemes either for infrastructure or new cargo handling technology development,
- Adopting new information systems,
- Removing the redundant working force and
- Adopting technocratic management,

elements necessary for effectiveness achievement (Baird 1995; Robinson 2002; Everett 2003).

The main forms of deregulation undertaken around the world consist of:

Full Privatization where port ownership is fully transmitted as far as property, possession, use and operation are concerned to a private company. This model was adopted by Great Britain (Baird 1995) and is considered to have failed, deterring other countries to follow it (Turnbull *et al* 1993; Thomas 1994).

Commercialization, a method regarding a distinction between the main activities of the Port Authority in individual operational units each one of which acts independently apart from the fact that they all remain public. Another pattern in the same model calls for the private sector to undertake some commercial activity through agreements with the public Port Authority. Such agreements may be contracts for

service provision, management assignment contracts etc. in this case, the public sector retains ownership and control of the port but additionally tries form an environment close to the private business environment (Notteboom and Winkelmanns 2001).

Corporatization is a method in which a fully public company is established with the duty to offer port terminals for long – range lease to the private sector. In some cases (e.g. Australian ports) the private companies gradually dispose and offer the superstructure leaving the Port Authority with the disposal of the infrastructure (Everett 2003). Some literature on the matter suggests that this model of privatization tries to give away public business units to independent state – owned companies with corporate structure resembling to the private sector structure. This strategy was adopted in an effort to improve port efficiency and its operational status, through limiting state intervention in operational matters.

Concession, a method of transferring certain parts of the port, for a certain period of time and for a predefined value of money. In the end of the period, ownership and property returns to the state. In this case, in reverse to leasing the beneficiary proceeds to the investment necessary for the expansion and the improvement of the existent port facility.

Management contract, which allows the public Port Authority to retain ownership of the port property and where the private sector offers the know-how for effective operation of the port or its terminals. The investment responsibility remains in the public Port Authority. The management contract' s duration is usually a five years period and does not demand direct, far-reaching investments from the private sector' s side.

*Built Operate and Transfer (BOT)*², a method in which private companies finance, construct and operate the port facilities. Operation and exploitation of the port usually lasts from twenty to thirty years and by the end of this period port property returns to the state.

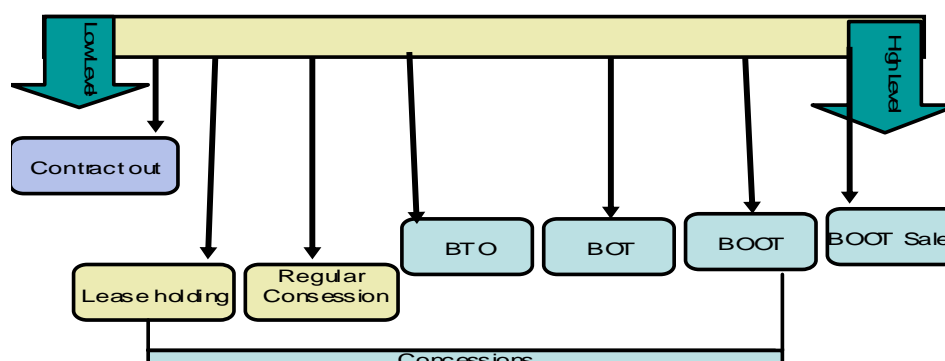
Joint Venture is applied by the establishment of an independent port organisation (a venture) with the participation of Port Authorities and private companies. The objective of this movement might be the development and operation of a port terminal. Costs and benefits from the operations are distributed among the participants.

It is quite obvious that private sector participation in the port industry can be applied in many different ways and varies according to the level of private participation in port operation. Public Private Partnerships seem to form the future relations for the businesses involved in the global port industry³. The various types of private sector participation in the port industry appear in the following figure (Figure 2) (De Monie 2005)

² Build Transfer Operate (BTO) construction of the infrastructure and the superstructure and disposal to the state. BOOT public and private ownership. BOOT Sales, give the capability of selling the port property in the future.

³ The Port of Rotterdam port Authority owns since 1999 a share of 35% of the major port operator in the port. This means that the Port Authority partners with this company in order to attain a more competitive and active part in the logistics chains. This decision on the other hand might be considered as an illegitimate one, undermining the Port Authority' s objectivity towards the other players in the same market.

Figure 2. Forms of private sector participation



Today after two decades of processing, the port industry is run by port operators, private companies on cargo handling and private maritime companies operate the dedicated terminals. These companies introduced flexible management, know – how, specialisation and innovation in the port production, invested in cargo handling and information systems, converting the port production from labour to capital intensive. Within this framework, pricing policy is based on the principles of profit maximization and competitiveness. The main objective of the business is cost minimization and quality improvement of the port product offered. Port infrastructure no longer constitutes a public good, since it is widely accepted that the “user should pay” (Goss 1986).

3.4. The Neoliberal Approach to port Contribution in the Regional Development.

Seaport clusters

In the Neoliberal model where the dominant entity is the business unit, concentration offers the individual businesses another way for organising their transactions in an environment with rapidly changing information and technology (Yap *et al* 2004).

This special pattern of spatial organisation of operations maximizes the technology and information flows between business units especially as far as smaller businesses are concerned. In the port case and the development of **seaport clusters**, cooperation and competition between businesses involved, (concentration that already exists since Keynesian period, Table 1), facilitate and accelerate the process of knowledge and information spill-over, establishing an entity capable of competing in the newly framed environment, without the essential presence of the public sector, since the system operates through self – organisation processes. Porter (1990) argues on this emphasizing that neighbouring leads to mutual transparency and visibility among competitors. In other words, businesses are able to observe the evolution of their competitors and this transparency stirs all businesses to go on improving their own competitiveness. This process results in a spatially concentrated competition, improving competitiveness for all concentrated operations involved (McCann 2001).

The agglomeration and concentration dynamics gather, even as business – oriented, seem to contribute, in a new way, to the local and regional development.

Profound example is that of the port of Rotterdam in the Netherlands that has formed in a port cluster, concentrating port, maritime and related activities, numbering thousands of businesses and organisations (De Langen 2003). The port’s impact is spread all over Europe and the region is a pole for investment attraction.

Port and maritime clusters have a local and a regional impact, enforcing employment and income input, attracting new investment and sustaining the traditional impact of the pole of development. Their impact their impact expands to over – regional level, since such ports, exactly because they are competent and are selected by the supply chains, are involved in various ways in transport networks that expand deeper in the hinterland.

Their connection with the inland transport means and terminals, in combination to the need for time at port minimization and door – to – door services, challenges the development of even greater transport networks. Cargo traffic creates value – added in every transshipment terminal until its final destination (Robinson 2002), defining a greater hinterland.

Port Transport Networks

In the 80's ports had to deal with the world trade changes and to operate as logistics centres. To do that, ports have to develop effective transport infrastructure in the hinterland and connections with the inland distribution centres. The location of inland distribution centres is taking place in areas with convenient access to the port through inland transport networks (Pardali 2001).

Networks can be port – oriented (Robinson, 2002) or ports can be network – oriented (Notteboom *et al* 2005). The network forms in a way that connects – end to end – the cargo shipper with the cargo receiver. Each such network has many sea – or land – terminals and many different roots of interconnection. These roots form in chains that compete, leading terminals in the sea and land market to compete. Through this process of competition, ports become a vital node in the supply chain and affect their hinterland.

A network – oriented port shows much stronger linkage with its hinterland which is even broader (Notteboom *et al* 2005) since the emphasis is given on the hinterland connection instead of port concentration. This is often a strategic choice for the transport industry in order to loosen the tight frame of the port and its lack of land, congestion and other ineffective elements that harm the system as a whole. The new trend of **port depolarization** is formed by the establishment of inland depots. The new terminals move the concentration and its impact away from the port broadening the hinterland even more.

The hub and spoke system

The new efficiency – driven **decentralization** planning has also an application to the foreland. The development of **the hub and spoke system** in the container industry is the main example (Notteboom *et al* 2005). Hub ports are huge but have no local impact since all cargo is transhipped to and from the smaller ports in a considerable geographical range away from the hub port. In the contrary no positive externalities as well as the customer's surplus deriving from cargo imports and exports goes to the local economy. This system is a sea – transport network with a global hinterland and a global impact. The benefit from these network operations is not local or regional but global, serving the development of the world trade and the wider sense of economic development (Musso 2004).

3.5. The role of the Port Authority.

Although the private sector enters dynamically the port production process, the necessity for the existence of Port Authorities is undeniable even by the Neoliberal model. Arguments for the maintenance of the public character of Port Authorities were formulated in the early 90's (Goss 1990 a and b). The most significant argument regarded infrastructure ownership rights, mainly because of the port's location on the

waterside. This fact was deterrent for private sector to invest in land that was owned by another party or in facilities with a long – range horizon of capital return. Public Port Authorities can ensure sustainable development for the port region and manage external economies and diseconomies stemming from port production. An also important argument suggests that there is a range of public goods offered within the port, such as lighthouses or buoys that have to be administrated by public Port Authorities.

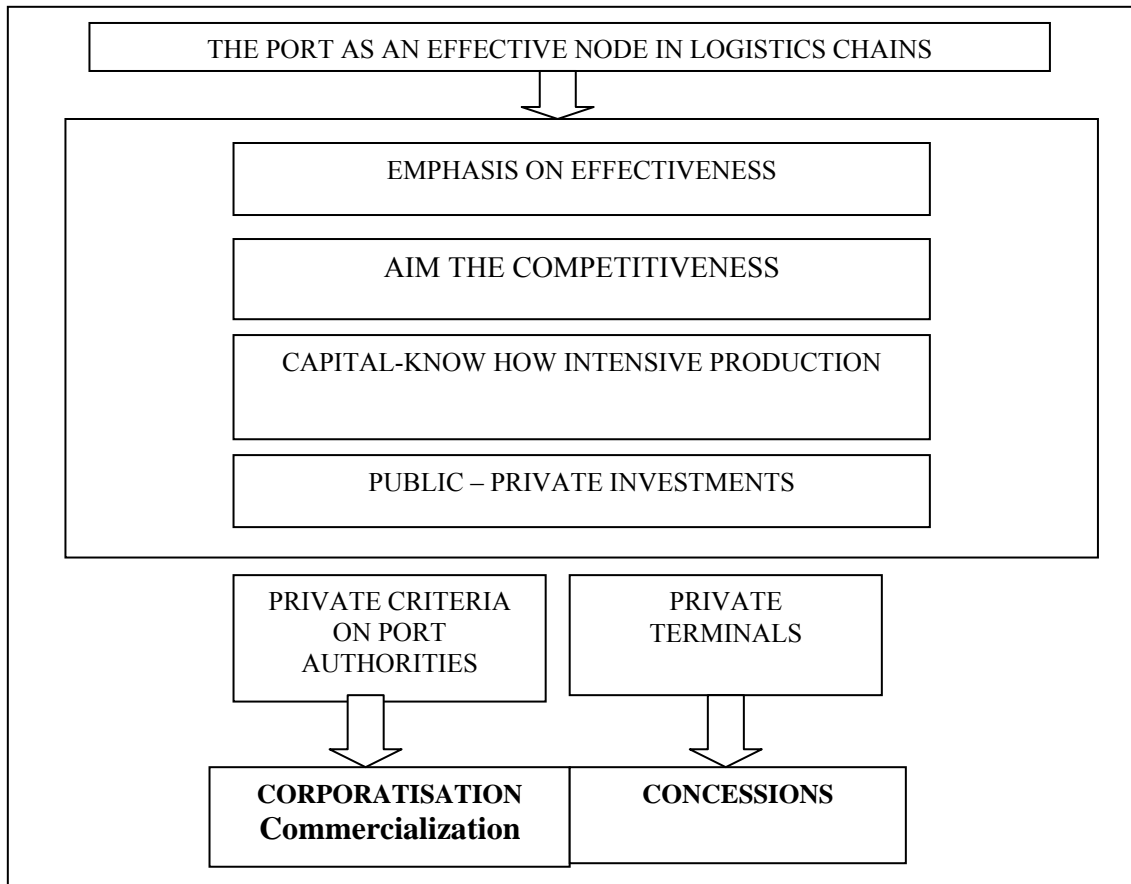
In the new model public Port Authorities still operate, with the exception that they turn the private sector into an advantage for the port. Strategy for Port Authorities in the new model is constrained in two main sectors: the first regards the strategies for the concession of exploitation rights of the port terminals to the private operators and the second regards the strategy for competitiveness improvement and supervision. The traditional role of the Port Authority remains, but moves to a second level.

Thus their role in the Neoliberal model is redefined and focuses on:

- Port capacity maximization, by developing new terminals through Public Private Partnerships,
- Improving port competitiveness (inter- and intra- port competition), aiming at an effective accession in the global logistics chains,
- Supervising intra – port competition,
- Maximizing competitiveness of the businesses and organisations involved in the seaport cluster and
- Ensuring operational safety and security for navigation as well as for the environment.

An emerging matter of controversy suggests that since the transport system integrates with its components being subject to such interaction that affects the whole system, there should be a unified administrative authority for the system. Its complexity imposes a compound authority that will regulate the operational framework without contradicting with its primary objectives maximizing benefits for businesses in the sector as well as for the communities subject to its operations. .this role could be assigned to an extended Port Authority, which would coordinate all operations and cooperate with the representatives of all parties involved, defining a flexible regulatory framework and supervising it.

Figure 3: The Neoliberal Model of port Development (Depolarisation and Dispersion Dynamics).



4. Conclusions.

In the Keynesian model the port and particularly its infrastructure, are turned to an advantage and are subsidised by the state, as a pole of attraction for industries and trade. Thus starting from port communities and port – cities, with great significance for the local economic development (an impact that can still be seen in big port cities such as New York, Los Angeles, Liverpool or Piraeus), ports for many decades have been the principal pole of attraction for industrial location and operations related to ships and cargoes. A result of this port infrastructure subsidisation policy, was the development of strong concentration and agglomeration dynamics with an, initially, local and gradually regional impact on economic development.

The increasing volume of the world trade and the market globalisation imposed an extensive port reform, mainly due to the emerging need for effective and efficient transport services.

Ports and shipping had to adapt, forming a step – by – step unified transport system that combines the different transport means and organises in competing chains. Within this changing environment, the ports as poles, evolve in port clusters with business oriented agglomeration dynamics that constantly pursuit competitive advantage in the global market. The port’s hinterland is now broader, so is its impact that spreads in the greater region. In the constantly developing hinterland that hosts the port’s interconnection with the inland transport and where chains develop, strong inland and sea (hub and spoke ports) transport networks develop. These networks force the hinterland to further expansion, spreading the economic impact even deeper

in the region. In the new hinterland new concentration dynamics in combination to ports' depolarization and logistics operations move the multiplier effect from local to global, sustaining eventually and developing anew the global trade.

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