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Port Authorities as cluster managers: the case of the Ligurian ports

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Abstract

The paper analyses the role of Port Authorities as cluster managers able to generate resources for investments with benefits for the intermodal transport chain as a whole. Assessment is made of Port Authority initiatives to foster the development of intermodality and the creation of dry ports. The framework proposed is then applied to the case of the Ligurian ports, which compete less as individual structures than as nodal points within integrated logistic chains. We argue that the integration of the land logistic interface may prove beneficial to the Ligurian ports, and that this can be achieved only if the Port Authorities act as cluster managers.

Keywords: Port governance, Cluster management, Italian ports.

1. Introduction

The inland leg is becoming ever more crucial in an increasingly globalised world in which competition among ports no longer takes place solely at the level of the services supplied and the handling speed of goods within the port area. For it also, and above all, depends on the frequency and reliability of connections with the hinterland which enable the express forwarding of goods to their destinations. It is particularly important to consider the logic whereby the advantages deriving from geographic localization are flanked by the quality, availability and functionality of the logistic services offered by

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the port of call. Important contributions to the study and understanding of this topic include Notteboom (1997), and Notteboom and Winkelmans (2001), who argue that geographical conditions do not completely explain port performance because other factors such as hinterland connections, terminal productivity, and a port's reputation are of key importance as well. As a consequence, competition takes place not only among single companies but also among entire supply chains (Harrison and Van Hoek, 2002).

The rapidly expanding volume of global trade has been driven by the innovation introduced by containerization, which has led to evolution of the supply chain (Levison, 2006). In fact, containerized traffic is undergoing high growth rates which are not expected to fall in the near future. Moreover, significant operations of concentration and horizontal integration have occurred in the sector, bringing about even more pronounced growth in the containerized transport market. This, in its turn, has strengthened the role of technology and increased investments in fleets (Beckers, 2006; De Monie, 2006; Penfold, 2006). In this context, shipping companies have begun to seek economies of scale by increasing the average size of their vessels (Cullinane and Khanna, 2001). In fact, in 2001 ships delivered and utilized on the Europe-Asia route had an average capacity of 5,000 TEU, while by 2006 this value had grown to 7,000 TEU. From a financial viewpoint, a 12,500 TEU vessel permits a saving at sea of some 29% compared with a 6,500 TEU vessel (Cazzaniga Francesetti, 2005).

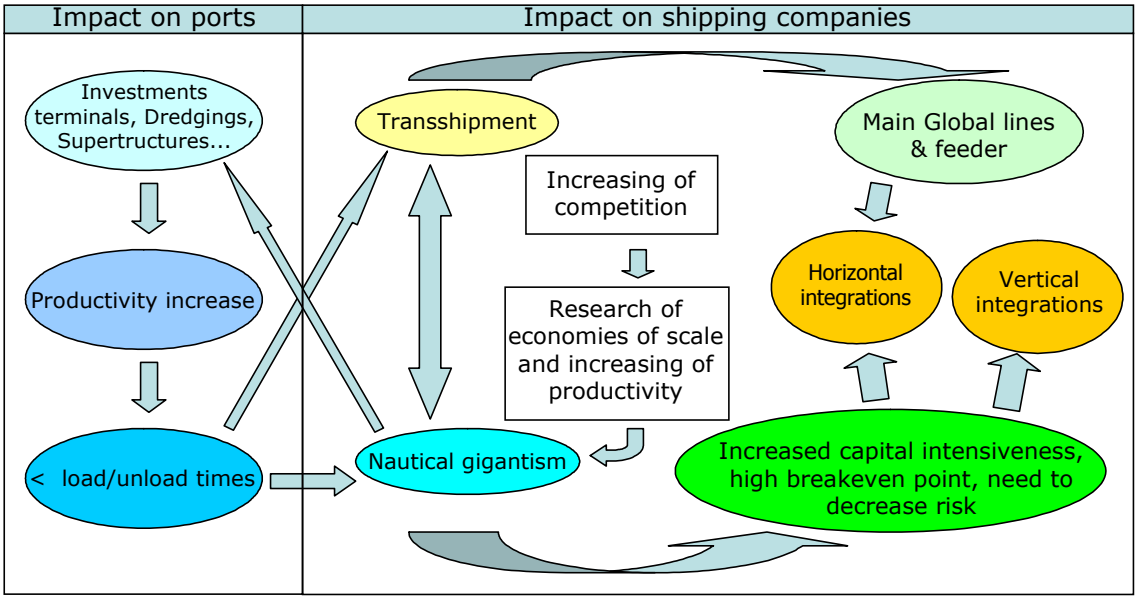

Figure 1: Liner shipping development and outcomes.

All these trends have also had repercussions in the port sector. As argued by Jansson and Schneerson (1987), economies of ship size are enjoyed at sea and diseconomies of ship size are suffered in port. As can be seen from figure 1, large vessels and a greater use of transshipment compel ports to make greater investments in dredging, dock features, information technology, cranes, and superstructures in general. The need to have such particular, expensive and standardized facilities has induced direct investments in container terminals both by some of the main shipping companies and by specialized worldwide terminal operators. Consequently, while the ability to handle traffics and port productivity grows, the time that vessels spend in ports decreases, which encourages even greater transshipment and the use of even larger ships.

Turnaround times (port access, manoeuvre and berthing operations, and the handling times of loading and unloading) are constantly improving. All these phenomena are enabling ports and terminals to achieve substantial productivity increases, with the consequent price reductions (Myung-Shin, 2003).

This paper focuses on the Ligurian ports, which have become crucial in this period due to the expansion of industrial production in the Far East and of trade with Europe, so that the Mediterranean has become once again the center of one of the main lines (Far East – Europe).

Ligurian ports are facing important challenges by relying on proposals for financial autonomy and the involvement of some of the main global container operators in the creation of new infrastructures and facilities. This article proposes a new role for the Port Authorities (henceforth PAs), namely as port cluster managers acting to generate resources for investments mainly via partnerships and coordination among cluster agents (De Langen, 2003). The voluntary investment made by a single port is too often smaller than the optimal amount of investments necessary for the entire intermodal transport chain (i.e. the optimal investment level for the cluster) where the marginal benefits of additional investments are equal to the marginal cost of additional investment.

The paper is organized as follows. Section 2 outlines a simple model of cluster firms behavior in which the undercapitalization problem is highlighted. Sections 3 and 4 describe the governance of Italian ports and the case of the Ligurian ports respectively. Section 5 concludes.

2. Some simple economics of port clusters

The literature on seaport clusters has been steadily growing over the past years, so that we currently have some relevant examples of maritime clusters serving as ideal benchmarking for the Ligurian ports analyzed in the present paper.

De Langen and Visser (2005) propose a comparison between Rotterdam and Lower Mississippi seaport clusters. The case of Lower Mississipi shows that collective action regimes are less developed in the cluster, compared with the seaport cluster of Rotterdam. The lack of leading firms is considered to be one of the main reason for the lack of technological innovation. However, although relevant, private firms are not the sole determinant of cluster performance. In fact, public bodies are considered to be key in coordinating investment and in solving problems of free riding. Rodrigue (2003) points out the importance of public sector efficiency to enhance local development induced by the activity of New York and New Jersey ports.

Relevant studies on port clusters include the works by Haezendock (2001) on the strengths and weaknesses of Antwerp's port cluster, Van Klink (1995) on the development of port networks, and Slack (1989) on the location behaviour of the port service industries. Finally, Lee and Rodrigue (2006) propose an interesting analysis on the the effects of trade reorientation on Regional Port Systems in Asia.

Before presenting our arguments on the Ligurian ports, we propose an admittedly very simple model of port cluster, the sole purpose being to highlight the problem of suboptimal capital stock due to positive externalities in a cluster.

In recent decades the port industry has become even more capital intensive. However, as convincingly argued by De Langen (2003), agents operating in a seaport cluster often enter into an under-investment situation. The reason is the likely existence of positive externalities on capital. In what follows, we sketch some simple economics of port clusters in order to clarify certain concepts useful for the analysis of the Ligurian ports.

Let us consider the problem of a firm interested in maximizing the net benefit from capital (k), defined as the difference between benefit (B) and costs (C). This problem can be simply formulated as:

$$\max_k \left[B(k) - C(k)\right] \tag{1}$$

The solution to problem (1) is:

$$B'(k_p) = C'(k_p) \tag{2}$$

where k_p is the private solution, i.e. the level of capital that a firm would choose if it did not consider the presence of externalities. In figure 2, the private solution is represented by point A.

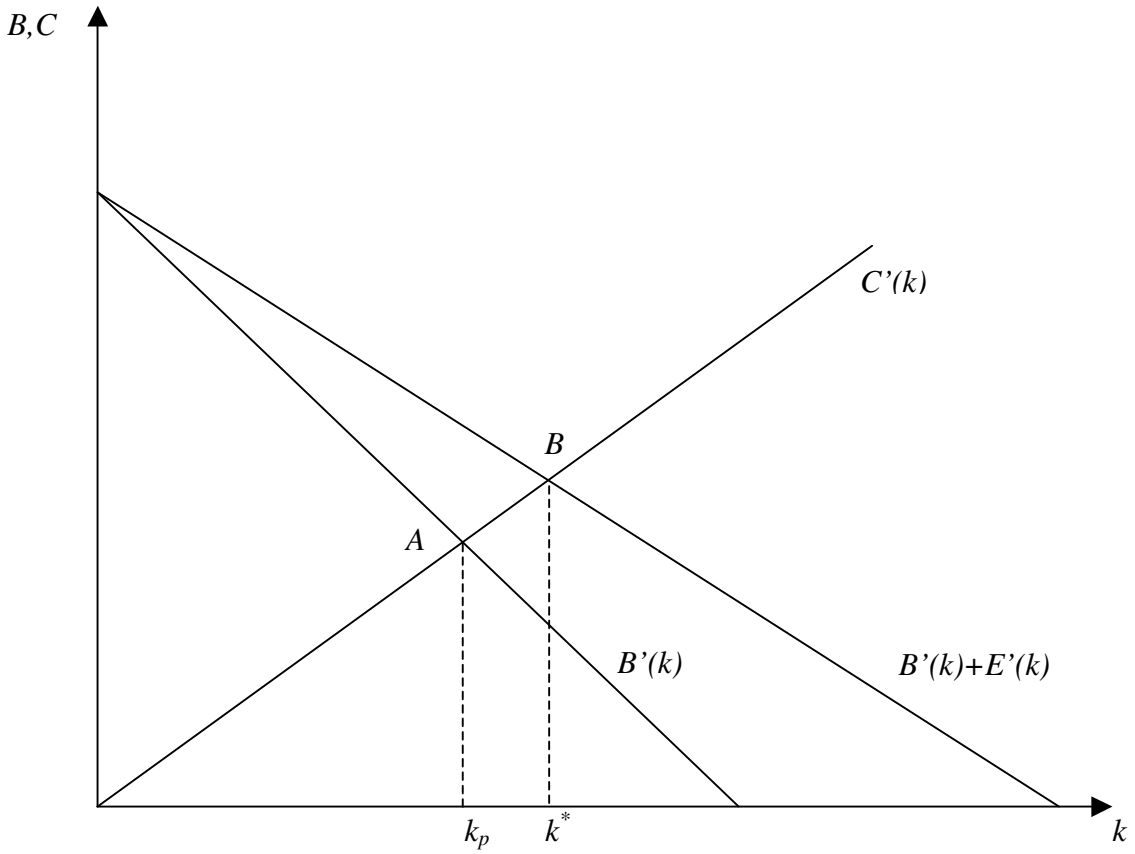

Figure 2: The consequences of positive externalities in port clusters.

However, integration into the production function of firms operating in a port cluster often generates positive capital externalities, as well argued by De Langen (2003). This, in turn, implies that problem (1) can be reformulated as:

$$\max_k \left[B(k) + E(k) - C(k) \right] \tag{3}$$

where $E(k)$ are positive capital externalities. The solution to (3) is:

$$B'(k^*) + E'(k^*) = C'(k^*) \tag{4}$$

which corresponds to the social optimum in figure 2. It is also clear from figure 2 that the presence of positive externalities may lead to a sub-optimal level of capital in the cluster, because $k^* > k_p$. Therefore PAs should be conceived as cluster managers able to coordinate and maximize investments in order to fill the gap between k_p and k^*. In fact, as argued by De Langen (2003), an ideal cluster manager should be characterized by:

a) incentives to invest with subsequent direct and indirect investment costs recovery;
b) a budget constraint strictly linked to seaport performance;
c) incentives to participate into public-private partnerships with other stakeholders in the cluster;
d) a commitment to invest only in projects for which coordination failures among firms lead to a clear underprovision of the good.

In order to meet those criteria, the cluster manager should be able to levy a "cluster tax (De Langen, 2003), i.e. its costs should be recovered by revenues as a direct or indirect function of port performance.

However, as will become clear in the next section, the governance of Italian ports is especially complex, and the role of PAs is very limited, unless a necessary reform on PAs financial autonomy is carried out.

3. The Governance of Italian ports

In the previous section we showed that a by-product of positive capital externalities is a relatively low level of capital stock. In this section, we outline current trends in Italian port governance, as well as some reforms currently determining the policy framework.

At present, Italian PAs act as landlord port authorities: the owner maintains ownership over the port, while the infrastructure is leased to private operating companies and services management is subcontracted to private terminal operators or service companies. This model of port management and the company port model (based on complete port privatization in which ownership and service provision are in the hands of the private sector) seems able to conjugate public and private interests with the common goal of port development (Saundry and Turnbull, 1997). The other two models of port governance are the port tool model, in which ownership is public with some port operations undertaken by private operators, and the service port model, in which ownership and service provision are entirely public (Brooks, 2004).

Despite the overall effectiveness of the model adopted in Italy, it has some shortcomings which are currently influencing the maritime policy debate. We summarize the main issues in figure 3.

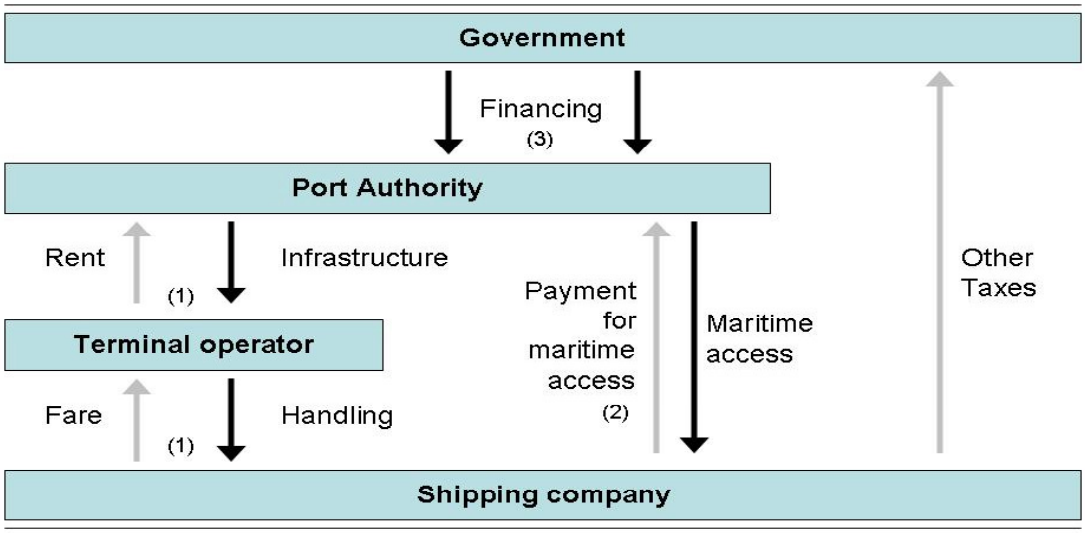

Figure 3: Actors and relations pattern in Italian ports.
Source: Wiegmans *et al.* (2002)

The range of possible PA revenues is defined by art.13 of law 84/94, which establishes PA financial liabilities. The most important are port duty for the embarkation and disembarkation of goods, lease rent for state property ? within the port, and some other subsidies from regional and other local agencies.

The relations between the terminal operator and the shipping company and between the terminal operator and the PA concern economic exchanges of services for fares and rents (link 1 in figure 3). Shipping companies, instead, pay duties to the PA in relation to maritime access and the loading/unloading of goods (link 2). Moreover, almost all the taxes and duties paid by shipping companies (above all: port duty for embarkation and disembarkation, treasury tax for embarkation and disembarkation, anchorage tax) have been collected directly by the PA only since 2007.[1] Previously these taxes were collected directly by the state and then given in return (and in part) to the PA in order to install and maintain the infrastructures guaranteeing access to shipping companies and operability to terminal operators (link 3).

The new system, even if it leaves some taxes in the hands of PAs, is within the meaning of a law that allocates? infrastructural works to the state (art.5 law 84/94), relieving the PA of this duty. The tax revenues of PAs are in fact lower than those of other European ports (Baccelli et al., 2007), and they are not sufficient to finance infrastructural works, which are financed by the state, or latterly by public-private partnerships. Despite the rapid evolution of the shipping market, PAs are still not able fully to meet the demand for port services, mainly because of their inadequate financial endowments and their close dependence on government financing policies. The 2007 Italian Budget Law, however, took some steps towards the financial autonomy of PAs, boosting a process that will enable PAs to invest in and develop new infrastructures. Giving ports greater financial autonomy may contribute substantially to cost recovery

[1] Art.163, codicil 982, Budget Law 2007

through whatever pricing policy? might be deemed appropriate by the ports themselves (Haralambides et al., 2001).

Devolution of the overall maritime fees collected in the ports (under codicil 982, Budget Law 2007) is a first and significant step in this direction because it generates additional financial resources, mainly coming from maritime traffics. The outcome is a doubling of the current tax revenues at the disposal of PAs. In particular, on the basis of 2005 data, for the three Ligurian ports this law would have meant an increase from approximately 15.4 million euros to approximately 52 million euros. Table 1 shows the differences between the old and the new fiscal regime[2].

Table 1: Port revenues collected by customs offices of Genoa, La Spezia and Savona.

Tax revenues		*New fiscal regime hipotesis*	
Collected by the Government		**Collected by the Government**	
Port duties		*Port duties*	
anchorage tax and surcharge	13,682,047	-	-
50% of port duty and surcharge for embarkation and disembark	9,155,464	-	-
100% of Treasury tax for embarkation and disembark	12,131,730	-	-
Total (A)	*36,016,649*	-	-
Other taxes		*Other taxes*	
Duties	573,158,932	Duties	573,158,932
Other taxes	2,281,709	Other taxes	2,281,709
VAT (B)	*3,327,065,824*	*VAT (B)*	*3,327,065,824*
Collected by Port Authories		**Collected by Port Authorities**	
anchorage tax and surcharge	514,37	anchorage tax and surcharge	13,733,484
50% of port duty and surcharge for embarkation and disembark	9,158,394	100% of Treasury tax for embarkation and disembark	12,131,730
surcharge for goods embarkation and disembark	5,728,225	100% of port duty and surcharge for embarkation and disembark	18,313,858
Total (C)	*15,400,989*	*Total (C)*	*51,417,638*
Total (A+B+C)	***3,953,924,103***	***Total (B+C)***	***3,953,924,103***

Source: Simulations on customs offices data as for 2005.

Moreover, the 2007 Budget Law will have to issue a "decreto attuativo" (implementing decree) in order to fix the quota of tax revenues different from taxes and from port duties (i.e. VAT and custom duties) to be devolved to each PA for infrastructure investment, with the simultaneous abolition of government transfers. This codicil 982 has proved to be particularly important, because the total annual tax revenues generated in the ports of Savona, Genoa and La Spezia amount to approximately 4 billion Euros (table 1). With such an amount, consequently, a few

[2] Note that in our analysis we mainly consider the container market. In doing so, we exclude cruises and general cargo, hence we do not consider the possibility of specialization of the ports under consideration. We make this choice mainly because of the overwhelming importance of containers in modern economies and because Port Authorities development plans (especially the one of Genoa) mainly, although not exclusively, consider container terminals development.

percentage points of this value would enable PAs to use financial leverage in order to undertake major investments.

To sum up, we have reported that the current system of fiscal devolution in Italy will provide PAs with financial resources that may prove beneficial to them when new investment is necessary. In the next section we argue that PAs are currently required also to act as cluster managers in order to participate in and to coordinate investments.

4. The case of Ligurian Port Authorities

As reported in the previous section, the financial capacity of PAs has been improved by recent legislation, so that PAs now have the means to undertake some of the investment required to support intermodal transport and logistics. However, as in the case of the Ligurian ports, the complexity of investments and the large number of stakeholders, as well as the fact that Liguria is a multi-port region, necessitate substantial coordination among agents.

As stated in section 2, positive externalities give rise to an under-capitalization of the cluster which can be remedied by coordination activity of the PA. In the case of Italy, in fact, financial autonomy is not likely to generate resources sufficient to cover all investment costs. Hence, PAs are currently forming PPPs in order to raise money mainly for logistics centers and inland areas. Involvement in PPPs is certainly only one of the ways in which PAs can coordinate investments (i.e. fill the gap between k_p and k^* in figure 2). In what follows we focus on the Ligurian PAs, which have been proven to be particularly active in this field (Baccelli et al., 2007).

Seaports may generally be regarded as gateways through which goods are transferred between ships and the shore (Goss, 1990; Jansson and Shneerson, 1982; Van Klink, 1995). Improving the hinterland access of seaports is, at least partially, an inter-organisational challenge, because the quality of hinterland access depends on the behaviour of a wide variety of actors, such as terminal operators, freight forwarders, transport operators, and PAs (De Langen and Chouly, 2004). With these considerations in mind, PAs are seeking to promote intermodal transport and logistics through the initiatives reported in table 2. These initiatives take mainly the form of agreements between railway companies and PAs and partnerships promoting intermodality, but also investments in logistic centers or inland areas and company shareholdings. The Ligurian PAs are quite active in this sector, and so too are the ports of Trieste, Venice and Taranto.

Table 2: Synthesis of Port Authorities initiatives for intermodality and logistics promotion.

	Participations in societies		*Agreements between Railway companies and Port Authorities*	*Partnership in society of promotion of intermodality*	*Investments in logistic centers or inland areas*	*Other activities*
	With Railway partners	*Establishment of a new company*				
Ancona			√			
Bari				√		
Carrara					√	
Civitavecchia			√			
Genova			√	√	√	
Gioia Tauro			√			
La Spezia			√	√	√	
Napoli	√			√		
Piombino					√	
Ravenna						√
Salerno				√		
Savona		√	√	√	√	√
Taranto			√	√	√	√
Trieste	√	√	√	√	√	√
Venezia	√	√	√	√	√	√

Source: Authors' elaborations on information from newspapers, magazine and direct inquiries as in September 2006.

The three Ligurian ports (Genoa, La Spezia and Savona) together account for more than 18.5% of overall national traffic (12% of maritime cabotage). Moreover, the Ligurian ports handle approximately 65% of Italian containerized traffic (transshipment excluded): in 2005 they handled approximately 90 million tons of goods (among which 42 million tons of general cargo), 2.8 million TEU and 4 million passengers, in 50 specialized terminals able to serve any type of vessel and good.

New investments (to improve port capacity) are currently pushing the Ligurian ports to improve their inland connectivity. The Ligurian PAs are at the core of an innovative process that consists in increasing terminal capacity and in enhancing intermodal transport and logistics through investments in railways and intermodal centers (figure 4).

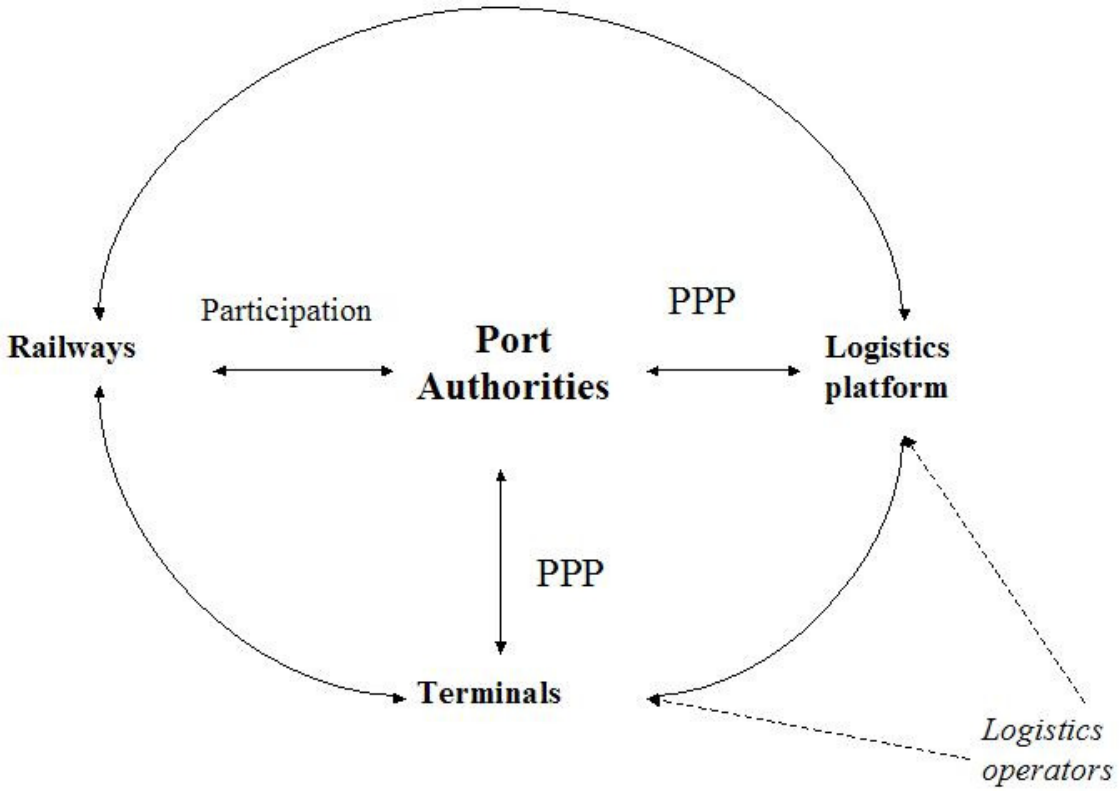

Figure 4: The role of Port Authorities.

For example, A.P.M. Terminals, which belongs to Maersk Group, plans to establish its North Tyrrenian home port at Savona Vado and to build a new container terminal in partnership with the Savona Port Authority. The project has already been approved by the local and central public administrations and it is included in the Port Master Plan. Maersk envisages investing about 100 million Euro in superstructures plus 50 million Euro in infrastructural works in this terminal, whilst the Savona Porth Authority is expected to invet a further 300 million. The final project was presented in summer 2006 and work will begin in 2008. This new container terminal will be located in the area of Vado Ligure and its capacity should be about 600,000 TEUs.

MSC has made investments in Genoa's Calata Bettolo, and the Eurogate Group, through its subsidiary Contship, is planning a major expansion of La Spezia's terminal areas. All these initiatives have to undergo a highly complex decisional mechanism for their ratification.

The ports of Genoa, La Spezia and Savona are currently developing railway projects (with the hinterland, and from there to Northern Italy and in general to Southern Europe) on the assumption that good railway connectivity will enable the Ligurian ports to expand their captive area outside national borders. For example, the market for the port of Genoa, the most important Italian port for direct calls services, consists almost exclusively of national origin/destination traffic (96%) and is concentrated in the central-northern Italian regions. The improvement of land accessibility is the focal point of a plan that foresees, in the short and medium term, important operations both infrastructural and organizational (Autorità Portuale di Genova, 2005). In the past few

years the Italian Port Authorities have promoted several initiatives inside and outside port walls, the purpose being to encourage intermodality and the development of the new logistic value-added services increasingly necessary to compete on a global level. Today, in fact, the development of a modern port requires an efficient network of railway connections with inland logistic platforms and with the relative hinterland (Van Klink, 1995). In this situation, ports must be efficient, thereby contributing to the competitiveness of the entire logistic chain. For these reasons, the Ligurian ports, congested due to a lack of space, have had to create stable and effective railway connections with the hinterland. They have consequently constructed dry ports just a few tens of kilometers from their docks which will represent the basis on which to grow and eventually offer additional logistic services (Autorità Portuale di Genova, 2005). With a dry port development strategy, the maritime port enlarges its hinterland, becomes closer to its customers, helps resolve its problems of saturation, and improves its ability to compete, offering direct services to customers and attracting new cargoes (UNCTAD, 2004).

However, the construction of new transport networks serving the port may have substantial impacts on organization and on traffic flows only in the long run. Moreover, this period of time may be prolonged both by the physiological? deficiency of public financing and by the frequent opposition raised against the construction of new infrastructures, which slows down or even interrupts their realization. It is therefore necessary to find a rapid solution that allows faster and cheaper transport to and from ports. In this regard, however, financial issues may be resolved by upcoming financial autonomy,[3] but PAs are also supposed to catalyze further private investments, both by finding partners and by stimulating the demand to increase investment profitability (Sanchez, 2006).

Table 3 reports the formulation and implementation of strategies to foster intermodality in each Ligurian port.

[3] Italian law, in art.6 codicil 5 of law 84/94 and in codicil 6 of the same article replaced by art.8 bis of D.L. 30 December 1997, n.457, converted into law 27 February 1998, n.30, permits port Authorities to "costituire ovvero partecipare a società esercenti attività accessorie e strumentali rispetto ai compiti istituzionali affidati alle Autorità medesime, anche ai fini della promozione e dello sviluppo dell'intermodalità, della logistica e delle reti trasportistiche[3]". Moreover, for application of the quoted law, reference has been made to D.M. 4 April 1986, according to which the port railway service within port borders is part of the services of general interest to be supplied against payment to the port's users.

Table 3: Formulation and realization of strategies in favor of intermodality.

	Aim	*Strategy*	*Realisation*
Genoa Port Authority	Development of railway traffic to/from port	Discipline economical and operational relations about connecting port with national railway service	Signed a protocol agreement with Ferrovie dello Stato
	Expand docks and inland areas	Creation of an inland port and connections between this and the port	Looking for an area to place this site, with Local Agencies
La Spezia Port Authority	Improving connections between port and S.Stefano Magra dry port.	Construction of railway tracks between the two sites	Participate and rely upon an external society for the construction of new infrastructures
	Transform S.Stefano Magra in inland railway terminal	Improve dry port facilities	Lengthen tracks inside the site to allow the creation and composition of complete trains
Savona Port Authority	Integrate port with industrial areas in Liguria and Piemonte	Exploit existent railway lines from Savona to Turin and Alessandria	Manage, through a certificate subject, railway marshalling and traction on two pass lines, from port to S.Giuseppe di Cairo
	Make the railway service reliable and frequent	Purchase some traction vehicles to improve railway times	Purchase 6 marshalling vehicles and 4 electrical locomotives (E645)

The topic of inland logistic platforms, moreover, introduces another problem that has always plagued the Ligurian ports system. Port competitiveness nowadays is increasingly influenced by the availability of integrated logistic services which require broad spaces for the creation of dry ports that expand the territory of reference thanks to efficient connections and the supply of specific services. But Liguria has considerable difficulties in accommodating this type of infrastructure because of:

- a lack of suitable spaces and, consequently, their high cost;
- increasing demand for space by surrounding cities.

This relative scarcity and/or the high price of space may induce (port) industries to move to regions where these inputs are available on more convenient conditions (Musso et al. 2000).

In order to remedy these shortcomings, the Ligurian ports have defined some common goals, such as the development of a network of inland logistic platforms beyond the Apennines in order to free up spaces in ports (narrow, crowded and expensive) and which can be used as buffers for goods coming from ports. In the short run, this network could fulfil some of the requirements of ports expansion and the need to improve inland connections without increasing road transport. The choice of an inland logistic structure will be influenced by infrastructural equipment, transport and logistic services, customs and tax conditions. Especial attention must be paid to the gradient of the railway from the port to the dry port, which must not be too high, because a service requiring double traction – like for example the Savona–San Giuseppe di Cairo route (24 km long, with a maximum gradient of 30‰) – involves added costs and has repercussions on the length of convoys.

In this regard, the Italian PAs, and the Ligurian ones in particular, have promoted various initiatives, among which:

agreements with Trenitalia, RFI, local public agencies, Ministero delle Infrastrutture e dei Trasporti, private management railway societies, and logistics centers ("Protocolli d'Intesa");

- the creation of partnerships among railway companies and among intermodality and logistics promotion companies;
- the purchase of areas dedicated to logistic activities;
- the purchase of shunting or railway traction vehicles;

All these aspects can be considered as constituting effective coordination among several port stakeholders. To be effective, this coordination must not only be commercial but also include cooperation and common initiatives to develop new expertise and shared learning processes, and to make investments with cluster benefit (De Langen, 2004). The PA is consequently required to provide incentives for investments with positive effects on other firms in the cluster. In other words, financial autonomy, as well as the need for new and complex investments, are inducing the Ligurian PAs to behave like cluster managers.

5. Conclusions

The paper has argued that the Ligurian ports are facing strong demand pressure because of the increase in maritime transport flows in the Mediterranean Sea. Drawing on cluster theory, it has shown that the problem of under-capitalization due to positive externalities could be solved if the Ligurian Port Authorities acted as cluster managers: that is, if they coordinated and catalyzed investment.

We have shown that the main means by which such coordination can be achieved is the creation of public private partnerships. However, it should also be stressed that continuous dialogue with all stakeholders in and around the port is crucial. The geographical dispersion of economic effects, in fact, in the absence of increasing value actions in the territory, may be perceived negatively, because goods passing through ports often do not generate significant employment or added value for the local communities (Ferrari et al., 2007). This is the main reason why the Italian Ministries of Transport, Infrastructure and Finance are discussing how to devise a law that will allow the devolution of part of the general taxes (V.A.T. and customs duties) to Port Authorities so that they can finance the most important port infrastructure projects.

In the context of increasing financial autonomy, Port Authorities are now able to act as cluster managers, coordinating actors and stimulating cooperation for joint investment. According to Musso et al. (2004), the ports of Genoa, La Spezia and Savona generate about 2 billion euros of value added and have a global employment impact of about 60,000 jobs. In this context, cluster management should be considered as a strategic ingredient in enhancing economic development induced by port activity in Liguria through a necessary governance of inter-firms and inter-institutional relations.

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