

GOVERNANCE IN SEAPORT CLUSTERS

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1 INTRODUCTION

Apart from well-known physical factors such as the location, maritime accessibility and hinterland infrastructure, the *governance* of seaports is an important determinant of their performance (see De Langen, 2001).

An analysis of the governance of seaports has mostly been limited to the role of the *port authority*. Notwithstanding the central role of port authorities in ports, we argue that an analysis of governance in seaports requires attention for the role of (private) firms. Institutional economic literature offers a useful framework for analysing advantages and disadvantages of alternative governance mechanisms and provides a basis for analysing the roles of port authorities.

In this paper we deal with the issue of cluster governance in seaports and illustrate our approach with an analysis of the port of Rotterdam.

First, we briefly discuss the theoretical foundations of the cluster governance concept. Second, we discuss the role of port authorities in the governance of seaports. Third, we present empirical results of a survey among 43 cluster experts in Rotterdam on the governance of Rotterdam's port cluster. We finalise the paper with conclusions.

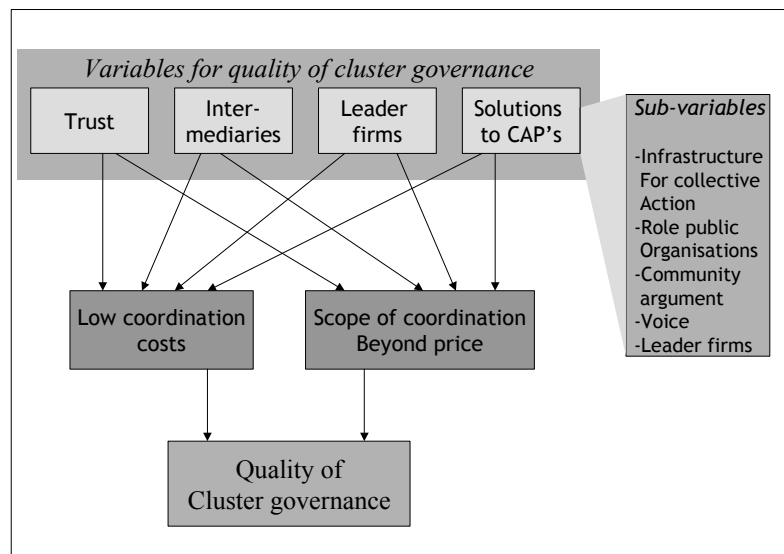
2 THE QUALITY OF CLUSTER GOVERNANCE

We define cluster governance as ‘the mix of and relations between various mechanisms of coordination used in a cluster’. The *quality* of the governance differs between clusters. The quality¹ depends on the *level of coordination costs* and the ‘*scope*’ of ‘coordination beyond price’. *Low* coordination costs and *much* coordination beyond price improve the quality of governance².

When the benefits of coordination are *distributed unequally*, when (the threat of) *opportunistic behaviour* prevents coordination or when benefits of coordination are *uncertain*, coordination beyond price does not arise *spontaneously* or *instantaneously*, even when benefits of coordination exceed costs. Therefore there is in general a shortage of coordination beyond price. More coordination beyond price improves the quality of the governance of clusters.

Based on a literature review, we distinguish four variables of the quality of cluster governance (see figure 1). Each of these is discussed below.

Figure 1: four variables of the quality of cluster governance



¹ We regard quality from the perspective of the firms in the cluster population.

² Given the presence of healthy competition. Since regulations prevent collusion, we claim that coordination beyond price adds ceteris paribus to the quality of cluster governance.

2.1 Trust

In clusters where the level of trust is high, (average) transaction costs are relatively low, because of low costs to specify contracts and low monitoring costs³. Furthermore, costs of coordination beyond price are lower and as a consequence, more coordination beyond price will arise.

The level of trust in a cluster is influenced by the importance of *reputation effects* in a cluster. If reputation effects are strong, abusing trust has negative effects and therefore a culture of trust is sustained⁴.

2.2 Intermediaries

The presence⁵ of intermediaries lowers coordination costs and expands the scope of coordination beyond price, for three related reasons. First, they provide a 'bridging tie' (McEvily and Zaheer, 1999) between two or more otherwise not connected exchange partners. Second, intermediaries reduce coordination costs because they 'connect cognitions'. Intermediaries can bridge cognitive differences between firms that operate in different market environments⁶. This role of connecting cognitions is especially important in clusters given the fact that clusters are characterised by a 'cognitive division of labour' (Belussi and Gottardi, 2000).

Third, intermediaries reduce the costs of starting and disentangling relationships (Nooteboom, 2000). Some intermediaries specialise in enabling cooperation (in projects). Such intermediaries lower coordination costs and reduce the threat of opportunism⁷. Haezendonck (2001) shows that firms in the port of Antwerp regard the presence of intermediaries a strength of this port cluster.

³ An additional positive aspect of trust is that specific investments are viable when partners can be trusted but not viable when the risk of opportunistic behaviour is high. Thus, specific investments for partners are more likely to occur in 'high trust clusters'.

⁴ This reputation effect has both an economic and a social aspect: *firms* strive for a good reputation because it yields positive returns, *managers* strive for a good reputation because it yields social status and personal career opportunities.

⁵ The presence of intermediaries in a cluster offers advantages because the costs of using a local intermediary are lower than the costs of using an intermediary outside the cluster. Furthermore, intermediaries are likely to have a dense local network and client base.

⁶ An example of such an intermediary is an architect, who 'speaks the language' of both construction workers and real estate developers.

⁷ The above mentioned reasons are the 'raison d'être' of many intermediaries. However, their presence in an industry is a different issue than their presence in a (regional) cluster.

2.3 Leader firms

Leader firms are ‘strategic centres with superior coordination skills and the ability to steer change’ (Lorenzini and Badenfuller, 1995). The behaviour of leader firms influences the performance of the cluster as a whole, because leader firms have both the *ability* and *incentive* to invest in the competitiveness of a whole network of firms. We identify three investments of leader firms with positive effects (these can be termed ‘leader firm externalities’) on other firms in the cluster:

- internationalisation;
- innovation;
- contributing to solving collective action problems (Olson, 1971, see paragraph 2.4).

Thus, leader firms can enable or even enforce cooperation and for that reason add to the performance of clusters.

2.4 Collective action in clusters

The ‘problem’ of collective action (Olson, 1971) is relevant in clusters. Even when collective benefits of co-operation to achieve *collective* goals exceed (collective) costs, such co-operation does not (always) develop spontaneously. Different CAP’s (Collective Action Problems), such as education and training and innovation⁸ are relevant in clusters. For each CAP a *governance regime* arises. In this context, a regime can be defined as a ‘relatively stable collaborative agreement that provides actors with the capacity to overcome collective action problems’.

Different *modes of coordination* play a role in a regime. We distinguish six general modes of coordination (see Hollingsworth and Boyer⁹, 1997 and Williamson, 1985): markets, hierarchies, interfirm alliances¹⁰, associations, public-private bodies and public bodies.

None of the different modes of governance is ‘structurally superior’, each mode has advantages and disadvantages. Consequently, different governance modes have a specific *domain*¹¹, and play a different role in a regime.

⁸ For each specific cluster, different issues are relevant, issues such as an education regime and an innovation regime are widely regarded as relevant for the performance of clusters.

⁹ Hollingsworth and Boyer (1997) also identify six modes of governance, five of which we use as well. We add public-private bodies as specific governance structures and do not include ‘communities’ as a governance structure, because communities are in our opinion no modes of interaction.

¹⁰ We do not use the term networks, since this is a very general term. Interfirm alliances is a more narrow concept and includes only relatively tightly coupled networks of firms.

¹¹ This is a ‘Williamsonian approach’, because each mode of governance has a ‘structural domain’, based on structural advantages and disadvantages. However, this does not imply that all modes of governance develop automatically in their ‘structural domain’. We acknowledge that an

The role of different coordination mechanisms, as well as the relation between these mechanisms differs between regimes. The mix and roles of different coordination mechanisms in a regime is *path dependent*¹², because past investments in a regime prevent smooth adaptation when adaptation costs are high (see Westlund, 1999). Furthermore, a regime defines the 'rules of the game' and becomes taken for granted. Finally, firms do not have the incentive to change a regime¹³. *Therefore relatively inefficient regimes can persist.* Consequently, governance regimes differ substantially, between countries, industries and clusters (see Hollingsworth et al, 1994). Hollingsworth et al (1994) even argue that differences in regimes are central in the competition between clusters. They argue that *'economic competition is increasingly becoming competition over different systems of production'* (Hollingsworth et. al., 1994, p. 38).

2.4.1 The quality of a regime

We identify five (cluster specific) variables of the quality of a regime. First, the *presence of an infrastructure for collective action* adds to the quality of a regime, because such an infrastructure provides opportunities to solve CAP's. The infrastructure for collective action consists of three kinds of organisations: *associations*, *public-private organisations* and *public organisations*¹⁴. *Associations* are well equipped to solve CAP's, since they act in the interest of all their members, *public organisations* can contribute to solve CAP's because they aim to generate collective benefits and *public-private partnerships*, as an arrangement, with involvement of both public organisations and associations, acting in the interest of their members, also can help overcoming CAP's¹⁵. Associations and public-private organisations do not develop automatically, but when they exist, they provide a fertile ground for solving CAP's.

analysis of the 'structural domain' is not sufficient to analyse and evaluate all complexities of governance regimes, but argue that such a framework is necessary to avoid 'story telling'.

¹² Campbell et al (1991) argue that 'When actors have already established associations (...) and thus the capacity for selecting far sighted cooperative strategies, they can more easily devise new multilateral governance mechanisms than actors from a sector where short sighted bilateral mechanisms dominate the governance regime (Campbell et al 1991, p. 331). This shows the path-dependence of regimes.

¹³ Instead of investing in the quality of regimes firms can also leave the cluster when regimes are not efficient or 'free-ride' on the investments of others.

¹⁴ The coordination mechanisms markets, hierarchies and interfirm alliances are used in clusters, but are used for transactions within a firm or between a limited number of firms. These coordination mechanisms are not suited for solving CAP's. Other kinds of institutions, such as discussion platforms and informal are not truly elements of an infrastructure for solving CAP's.

¹⁵ Public-private organisations and public organisations can be regarded as elements of the infrastructure for collective action (of a cluster) if they are established to generate *cluster specific collective benefits*.

Second, the *role of public organisations in a regime* influences the efficiency of a regime. Public organisations can play a role in solving CAP's, but unlike private institutions they are not primarily driven by economic incentives. Public organisations can be 'prospective partners' capable and willing to contribute to solving CAP's but can also be organisations with a very modest involvement in solutions to CAP's.

Third, *voice* (see Hirschmann¹⁶, 1970) of firms is important because associations, public and public-private organisations do not adapt automatically. They face only limited 'selection pressure' and as a consequence, adaptation is more likely when firms use their voice. Since adaptations improve the quality of a regime¹⁷, voice adds to the quality of a regime.

Fourth, the *validity of a community argument* adds to the quality of a governance regime (Bennet, 1998), since a higher willingness to invest in the 'port community' enables better solutions for CAP's. Fifth, the role of *leader firms* increases the quality of the regime, because leader firms have incentives and resources to invest in CAP's (see section 3.4.).

2.4.2 Collective action in seaports

A CAP can be identified on the basis of two (related) criteria: first, investments should have benefits for a large number of firms in the cluster and second, benefits cannot be priced effectively. CAP's are especially relevant for port clusters because one broad 'port service' exists. This port service is a combination of the services of different firms, such as pilots, towage firms, terminal operators, hinterland transport companies, transport service providers and transport intermediaries. All these companies benefit from a competitive port service, and contribute to the port service. None of the companies can fully appropriate the full benefits of a high quality port service. We discuss five CAP's¹⁸ that are likely to be relevant in seaports.

¹⁶ Hirschman discusses three possible reactions when confronted with an unsatisfactory situation (in his case working conditions): exit, voice and as a third possibility, 'silence'. The first two are sources of pressure, the third is not. When applied to association members, exit means that firms do not use services of associations. Exit does not directly contribute to the quality of a regime.

¹⁷ Campbell and Lingberg write with regard to changing a regime that 'actors eventually select a new governance regime as streams of action intermingle in complex ways. Trial and error learning as the result of spontaneous interaction may predominate in some instances (...). In this sense, selection is very much a process of muddling through. In other cases, deliberate coordinations among organisations will take the place of, or supplement, trial and error (Campbell and Lingberg, 1991, p. 331). This illustrates that adaptation of regimes is far from spontaneous.

¹⁸ Four of these five issues are relevant for clusters in general, hinterland accessibility is a port specific governance issue. These five issues are important but not the only five issues. Other relevant issues include the relation between port and city and port expansion.

A first CAP is innovation. *Innovation regimes*¹⁹ influence the size of ‘knowledge spillovers’ (see Edquist, 1997 and Cooke et al., 1998 and Paniccia, 1999). Innovation regimes differ between clusters and these differences affect performance (Belussi and Gottardi, 2000). *Associations* can play a role as knowledge intermediaries. Members of associations have (indirect) access to a large network of firms possessing knowledge and information. Public-private knowledge institutes and public research centres are also included in an innovation regime.

Training and education is a second CAP²⁰. Associations can engage in providing education and collective bargaining for education. Furthermore, associations monitor the quality of the ‘education and training infrastructure’, consisting of public and public-private education institutes.

Internationalisation is a third CAP. Internationalisation of firms is predominantly a market driven process, but the local embeddedness of firms in a cluster²¹ can be a barrier for internationalisation. This barrier arises because of ‘lock-ins’, ties that ‘blind’ (Pouder and St. John, 1996) and a closed inward orientation (Porter, 1990 terms such clusters ‘insular clusters’).

Internationalisation requires firms in clusters to be included in external ‘open’ networks (Blackburn, 1993). External networks guarantee that a cluster remains open for new developments. Such networks increase the ‘propensity to change’ (see Best, 1990).

Associations can play a role in an internationalisation regime, for instance by providing information, by monitoring export regulations, by organising collective representation and by acting as a ‘bridging tie’. A public port authority can engage in similar activities to reduce the barriers to internationalisation.

Marketing and promotion is a fourth CAP. Marketing and promotion activities have in general a twofold goal: first, to attract *companies* to the port cluster and second, to attract *cargo* to the port. Both activities have collective good characteristics: all firms benefit indirectly (and sometimes directly) from these marketing efforts, but for individual firms benefits do not exceed costs. Therefore, the marketing of the port is a ‘collective good’.

Hinterland access is a fifth CAP. Hinterland access is crucial for the attractiveness of seaports (Kreukels and Wever, 1998). The quality of the hinterland access depends on investments of firms in the port cluster. However, no individual operator can fully appropriate the benefits

¹⁹ Cooke et. al (1998) uses the term ‘regional system of innovation’, Brackzyk et. al (1998) the term ‘regional innovation systems’.

²⁰ Since labour is mobile, all firms in a cluster benefit indirectly from investments in training and education.

²¹ Albertini (1999) argues that internationalisation is indeed to some extent a ‘collective process’: “the main transformation process can be identified in the evolution of the district from closed contextual ‘community networks’ to ‘semantic’ and ‘market’ networks -that are open and integrated with the global economy” (Albertini, 1999, p. 113).

of a good hinterland access, but a variety of firms in the cluster benefit from it. These firms - and the port authority²²- could benefit from collective action.

An important issue in this respect is the role of *inland nodes* in a port network. Van Klink (1995) convincingly argues that ports aiming to optimise their hinterland access should create port networks with inland nodes. The port authority, together with private port operators and other stakeholders could co-invest in such hinterland nodes. In practice, many port authorities and firms in the port cluster do invest in hinterland nodes, examples including Marseilles in Lyon, Amsterdam in Duisburg and Hamburg in a variety of eastern European countries. Such investments can be analysed as the outcomes of a 'hinterland access regime'.

3 PORT AUTHORITIES AS 'CLUSTER MANAGERS'

Even though a variety of actors play a role in the governance of a seaport cluster, the *port authority* is the most central actor²³. The term 'cluster manager' can be used to describe the role of the port authority²⁴. We discuss the role of a cluster manager in general, the institutional position of port authorities and sources of revenue and investment decisions of port authorities.

3.1 The role of a 'cluster manager'

A 'perfect' cluster manager would be an organisation with the following four characteristics²⁵.

1. A cluster manager has *incentives* to invest in the cluster, because its revenues are related to the performance of the cluster. The 'perfect' cluster manager would receive a share of the value added generated in the cluster as revenue, for instance through a 'cluster tax'.

²² Public authorities are generally deeply involved in safeguarding the quality of accessibility, through investing in infrastructure, infrastructure utilisation, and spatial planning.

²³ The following quote illustrates the role of port authorities: "The modern port can be described as a community of independent enterprises tied together by a common interest in maritime affairs. Central to this community is an entity known as the port authority, always a regulator, usually a landowner, often a developer and sometimes a terminal operator." (Drewry Shipping Consultants 1998, p. 11).

²⁴ The re-structuring process in many seaports can be understood as a transformation of port authorities 'from terminal manger to cluster manager'.

²⁵ Since economic rents exist in many seaports (see Kent and Ashar, 2001) a sound national relatory framework should prevent port authorities from generating monopoly profits.

2. A cluster manager invests in activities with cluster benefits (instead of firm specific benefits). Furthermore, the cluster manager aims to invest when 'cluster benefits' exceed costs²⁶.
3. A cluster manager aims to distribute investment costs for investments to those firms that benefit. This involves co-finance arrangements with a specific group of beneficiary firms.
4. A cluster manager operates self-sustaining: over time investments equal revenues²⁷.

The port authority matches all four criteria: they have incentives and resources to invest in the cluster. The port dues and lease revenues are resources to invest in the port cluster. Furthermore, they generally are self-sustaining and invest in the performance of the cluster as a whole. Port authorities invest in activities with general benefits, such as port expansion, safety and dredging. Given their institutional position, most port authorities are not profit driven²⁸.

The port authority owns and exploits the port area and benefits when the port cluster is an attractive location because they can lease more land and charge higher prices. Furthermore, port authorities collect 'port dues'. Thus, the more ships call a port the higher the port dues. For these two reasons, port authorities have a clear incentive to invest in the performance of the port cluster²⁹. Thus, port authorities can be regarded as cluster managers³⁰.

²⁶ This is a different way of approaching investments of port authorities than the traditional one, that focuses on the 'border' between markets and public organisations. Even though the approach may be different, the outcome is the same: port authorities should refrain from operational investments, for example in terminal operations, because these investments do not have collective benefits. Land reclamation and exploitation do have collective benefits and cannot be left to private firms, precisely for that reason.

²⁷ Under these conditions, ports are not subsidised. Governments might 'subsidise' ports by financing breakwaters or constructing infrastructure, but such 'subsidies should not -and generally do not- blur the financial accounts of port authorities. Furthermore, some activities of a port might be of a 'public character'. Examples could include environmental control and safety control. If this is the case, these activities financial accounts should be transparent, so that it is clear how and how much is paid for these public services. Finally, return on invested capital should in this context also be regarded as investments.

²⁸ Since port authorities match these criteria, they are likely to act (to some extent) as cluster managers, but they are not 'perfect' cluster managers, because their revenues are not perfectly related to the performance of the cluster.

²⁹ The 'Hanzeatic port model' (Kreukel and Wevers, 1998) where the local or regional administration controls the port authority, is relatively widespread, especially in continental Europe. In this model the port authority has an additional motive, apart from the above mentioned economic incentives, to invest in the port cluster: it generates employment and value added in the port region. For regional policy makers, such effects are important.

³⁰ Seaports clusters are special because of the prominent role of port authorities. In many other clusters, such as the Dutch maritime cluster (De Langen, 2002) the shipbuilding cluster in the Northern Netherlands (Van Klink and De Langen, 2001) and Silicon Valley (Hall and Markusen,

3.2 Revenues of port authorities

The port authority has various sources of revenue. The existence and relative importance of various charges differs between ports (Ashar, 2001). In general, port authorities generate revenue from three sources:

- charges to shipowners/ ship operators;
- charges to tenants in the port, including terminal operators;
- charges to cargo-owners.

Charges for shipowners/ship operators are termed 'port dues' and in most cases related to the size of vessels. These port dues are justified by investments in dredging, safety systems, and investments in port basins. Charges for tenants are lease charges to firms such as terminal operators and warehousing and production firms. Charges for cargo owners are termed wharfage and are mostly related to cargo volume or to the value of goods. Some port authorities do not have wharfage charges, because cargo owners indirectly pay both other charges as well. In such cases, a part of both other charges can be conceived as 'pseudo-wharfage'.

This implies that the port charges do not have to be fully justified on the basis of investments with benefits for either tenants or shipowners. Investments for the benefit of cargo owners, such as investments in hinterland infrastructure, hinterland access or warehousing facilities, can be justified because the cargo owners as users of the port pay the port charges 'in the end'. Therefore, investments with benefits for these cargo owners are justified, even if port charges are paid only by tenants and shipping firms.

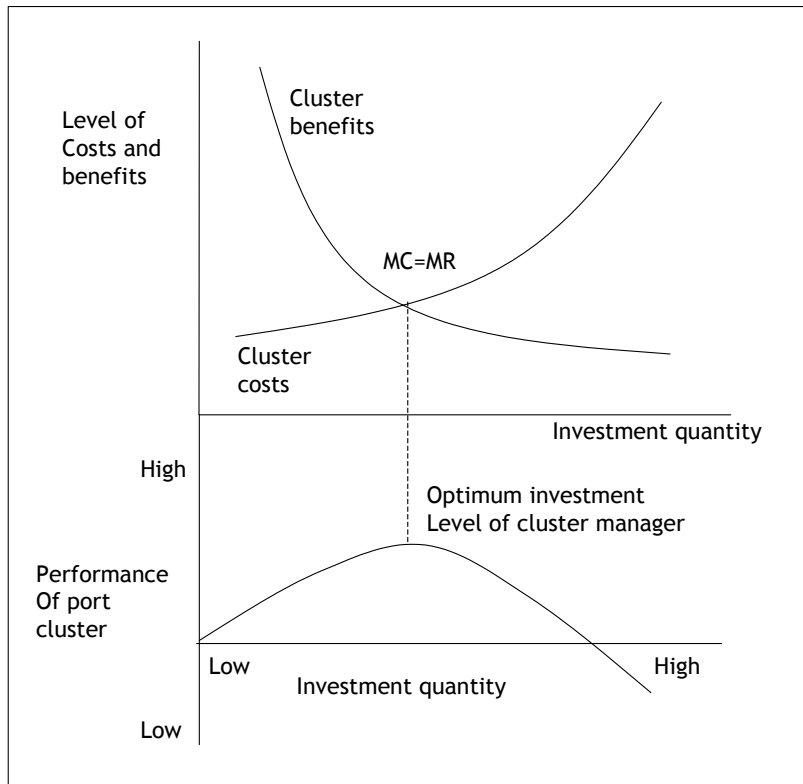
3.3 Investment decisions of port authorities

The port charges have to be justified by *investments* of the port authority. 'Investment appraisal' -on the basis of which criteria do port authorities decide to invest- is therefore a central issue for port authorities. We claim that the following simple rule is a guideline for investment appraisal of port cluster managers: benefits for the cluster of an investment should exceed costs for the cluster. Cluster benefits are the sum of all benefits of firms in the cluster, cluster costs are the costs of an investment for firms in the cluster. In most cases costs are incurred because port charges are required for cluster investments. Since costs equal revenues, a high investment level requires high port charges. Figure 2 visualises the 'optimal investment quantity' of (port) cluster managers.

1985) a central actor with a similar set of incentives, resources and a similar institutional position is lacking. Therefore, cluster management is likely to be more advanced in seaports than in other clusters.

Ezafus

Figure 2: the optimal investment quantity of a cluster manager



Port authorities have a certain minimum level of investment (for instance for dredging and maintenance). If they increase port charges and (re-)invest these revenues in the port (cluster), this increases the performance of the port. After a certain optimum level of investments, further tariff increases combined with more investments will reduce the performance of the port cluster. In the optimum investment level marginal costs equal marginal benefits: the effect of an additional investment in the port cluster has the same effect as a marginal reduction of port tariffs. Furthermore, the marginal benefits of a 'reservation' for future investments also equal marginal costs³¹.

3.4 Investments of port authorities

Figure 2 provides a basis for investment decisions of the port authority. On the basis of our analysis of factors influencing the performance of port clusters (De Langen, 2002) and a review of the literature on the activities of port authorities (Stevens, 1999, RMPM, 2002) we

³¹ Finally, one could add that the marginal effects of the two different tariffs are the same as well: a reduction of land prices has the same effect on the cluster performance as the reduction of port dues.

identified a number of investments port authorities engage in (see table 1). However, not in all port clusters, such investments are ‘a priori’ justified because benefits exceed costs.

Table 1: investments of port authorities (cluster managers)

| Type of investments | Cluster Investments | Financial arrangements |
|----------------------------------|---|-----------------------------|
| Basis physical infrastructure | Dredging | Through port dues |
| | Quay construction | Through land lease |
| | Land reclamation and development | Through land lease |
| | Rail and barge service centres | specific charges /port dues |
| | Safety infrastructure | Through port dues |
| | Inter terminal transport infrastructure | Through specific charges? |
| | Port re-development | Land lease |
| Advanced physical infrastructure | Hinterland terminals (dry ports) | Specific charges |
| | Industrial pipeline infrastructure | Specific charges |
| | Warehousing facilities | Specific charges |
| | Distribution zones | Land lease charges |
| | Cargo handling equipment | Specific charges |
| | Dedicated freight transport systems | Specific charges |
| | Dedicated cargo handling facilities (including all weather facilities and project cargo facilities) | Specific charges |
| | Facilities to intensify land use | Land lease charges |
| | Facilities that enable co-siting and equipment sharing | No charges? |
| Port services | Energy and water supply | Port dues |
| | Waste collection | Port dues /specific charges |
| | Towage services | Port dues /specific charges |
| | Security | Port dues /specific charges |
| ICT infrastructure | Web-based port community system | Specific charges? |
| | Port information system | Port dues /specific charges |
| | ICT system for commodity trade | Port dues /specific charges |
| Attract economic activities | Venture capital provision | Specific charges |
| | Office space provision for SMSF's | Specific charges |
| | Real estate investments in port area | Specific charges |
| | Marketing and promotion of the port | Port dues, Land lease |
| | Acquisition of firms | Land lease |
| Promote innovation | Innovation platforms | Port dues? |
| | Co-finance joint research projects | Port dues? |
| Improve quality of workforce | Labour pool | Specific charges |
| | Training and education infrastructure | Port dues, Land lease |
| | Recruiting youngsters to port related schools | Port dues, Land lease |

This table provides a basis for analysing to what extent, in which way, and with which financial arrangements port authorities engage in cluster management.

3.5 The institutional position of port authorities

The institutional position of port authorities differs widely between countries (Stevens, 1999).

Broadly speaking, three different institutional structures can be identified: public *national* port authorities, public *regional/municipal* port authorities or private ‘port authorities’, that own and lease the land to terminal operators. The cluster perspective provides a basis for assessing the strengths and weaknesses of these different institutional structures. For each of these institutional structures we *assume* that they operate as *landlords*³². The institutional structure of landlord port authorities is still widely different between countries.

We argue that, given an appropriate (inter)national regulatory framework³³, the regional/municipal port authority is the most efficient, precisely because it has the incentives and resources to act as a cluster manager. Table 2 shows the arguments for this claim.

Table 2: reasons for having regional/local and public landlords

| | |
|---|--|
| Advantages regional public port authority vis-à-vis a regional private port authority | Private port authority aims at maximising profits; this might be harmful for firms in the cluster/ consumers. Private port authority is less capable of solving CAP's, because it is profit driven. This will raise transaction costs. |
| Advantages regional public port authority vis-à-vis a national public port authority | Regional public port authority has incentive to invest in a port when cluster benefits exceed cluster costs, national public authorities complicate this, because of the risk of redistribution of funds. National public authorities might administer competing ports. This puts pressure on investment decisions. |

³² The ‘service port’ model is widely regarded as inferior to a landlord model, for a number of reasons. However, the issue of what is the appropriate institutional setting for a landlord port is not clear.

³³ More specifically, the regulatory framework should enforce:

- a level playing field;
- a self supporting port authority;
- free market access in the port (cluster);
- no abuse of monopoly power.

4 CLUSTER GOVERNANCE IN THE PORT OF ROTTERDAM

In this section we present an empirical case study of the port of Rotterdam. We interviewed 43 port experts³⁴ in the port of Rotterdam. First, we deal with the importance of cluster governance for the performance of the cluster. In the next four paragraphs, we discuss the empirical results for the four variables that influence the quality of the cluster governance. Sixth, we briefly discuss the role of the port authority in Rotterdam and end with conclusions.

4.1 *The importance of cluster governance in Rotterdam's seaport cluster*

We asked respondents to rank four variables according to importance. The results are presented in table 3.

Table 3: the importance of four broad variables of cluster performance

| Variable | Score |
|--|-------|
| Cluster structure (number of firms internal competition, heterogeneity of firms quality of location) | 2.2 |
| General economic climate | 2.2 |
| Cluster governance | 2.7 |
| National and international policies | 2.9 |

These results show that cluster governance is less important than the structure of the cluster and the economic development in general, but more important than national and international policies.

The experts were also asked to indicate the relative importance of the four variables of cluster governance, also by ranking them. These results are given in table 4.

³⁴ These experts are selected on the basis of three criteria: job position, years experience in the port industry and involvement in cluster governance. A first selection of about 38 was made in cooperation with prof. Welters, former director of the port association. This list with experts was supplemented based on the suggestions of the port experts. Overall, 43 of the 49 experts on the list were interviewed and filled out a questionnaire.

Table 4: the importance of four governance variables

| Variable | Score |
|----------------------------|------------------|
| Trust | 1.7 |
| Presence of leader firms | 2.0 |
| Solutions for CAP's | 2.8 ^a |
| Presence of intermediaries | 3.5 ^a |

^a significantly different from the scores of the other variables. By significant we mean less than 5% change that such a difference arises with random responses.

Table 4 shows that the presence of trust and leader firms are the most important variables. The presence of intermediaries is regarded as not really important, while solutions to CAP's are moderately important.

4.2 Trust in Rotterdam's port cluster

Virtually all cluster experts agree with the proposition that trust is important for the quality of the cluster governance, and as discussed above, argue that trust is the most important 'governance variable'. The cluster experts evaluated the port of Rotterdam and its main competitors, Antwerp and Hamburg, with regard to the presence of trust. The results are given in table 5.

Table 5: presence of trust; evaluation of the experts (scores ranging from -5 -very bad to +5, very good)

| | Rotterdam | Antwerp | Hamburg |
|-------|------------------|------------------|------------------|
| Trust | 0.8 ^c | 1.8 ^b | 1.7 ^b |

^b significantly better than in worst port

^c significantly worse than in both competing ports

This table indicates that the experts judge Rotterdam as a port cluster where the level of trust is low. Both competing ports do better in this respect.

4.3 Leader firms in Rotterdam's port cluster

Virtually all cluster experts also agree that the presence of leader firms is an important determinant of the quality of cluster governance. The experts evaluate the three competing ports as follows:

Table 6: presence of leader firms: evaluation of the experts

| | Rotterdam | Antwerp | Hamburg |
|--------------------------|-----------|------------------|---------|
| presence of leader firms | 2.0 | 2.3 ^b | 1.5 |

^b significantly better than in worst port

Antwerp is evaluated the most positive, Hamburg has the lowest score. In general the experts indicate that all three ports do score relatively good with regard to leader firms.

4.4 Intermediaries in Rotterdam's port cluster

With regard to intermediaries, a significant majority of the experts agree with the presumed positive effect of intermediaries on cluster governance, but nine out of the 43 disagree. Those that agree also indicated the relative importance of six intermediaries (see table 7).

Table 7: the relative importance of six port intermediaries

| Intermediary | Rank |
|--|------------------|
| Forwarders | 2.0 ^a |
| Non asset-owning logistics service providers | ^b 2.9 |
| Ship's agents | 3.0 |
| Associations | 4.0 |
| Commodity traders | 4.2 |
| Shipbrokers | 4.4 |

^a significantly higher score than the other five intermediaries

^b this group of intermediaries are significantly more important than the other three

This table indicates that the forwarder is the most important intermediary in the port cluster. Furthermore, all intermediaries that 'control' cargo are more important than the other three, including the associations. The score of associations is relatively low: they are not regarded as important intermediaries in the port cluster. Antwerp comes out best while Hamburg is judged to be less well endowed with intermediaries. Furthermore, all three ports have relatively high scores (see table 8).

Table 8: intermediaries: evaluation of the port experts

| | Rotterdam | Antwerp | Hamburg |
|----------------------------|-----------|------------------|---------|
| presence of intermediaries | 2.1 | 2.5 ^b | 1.7 |

^b significantly better than in worst port

4.5 Solutions for CAP's in Rotterdam's port cluster

Finally, we discuss the quality of solutions for collective action problems. Out of the five proposed CAP's in seaports, the cluster experts judged four relevant:

Table 9: CAP's in Rotterdam's port cluster

| Issue | Collective action problem | |
|-------------------------|---------------------------|-----------------|
| | Relevant | Not relevant |
| Training and education | 38 ^a | 3 |
| Marketing and promotion | 37 ^a | 4 |
| Hinterland access | 37 ^a | 4 |
| Innovation | 29 ^a | 12 |
| Internationalisation | 13 | 28 ^a |

^a significant majority

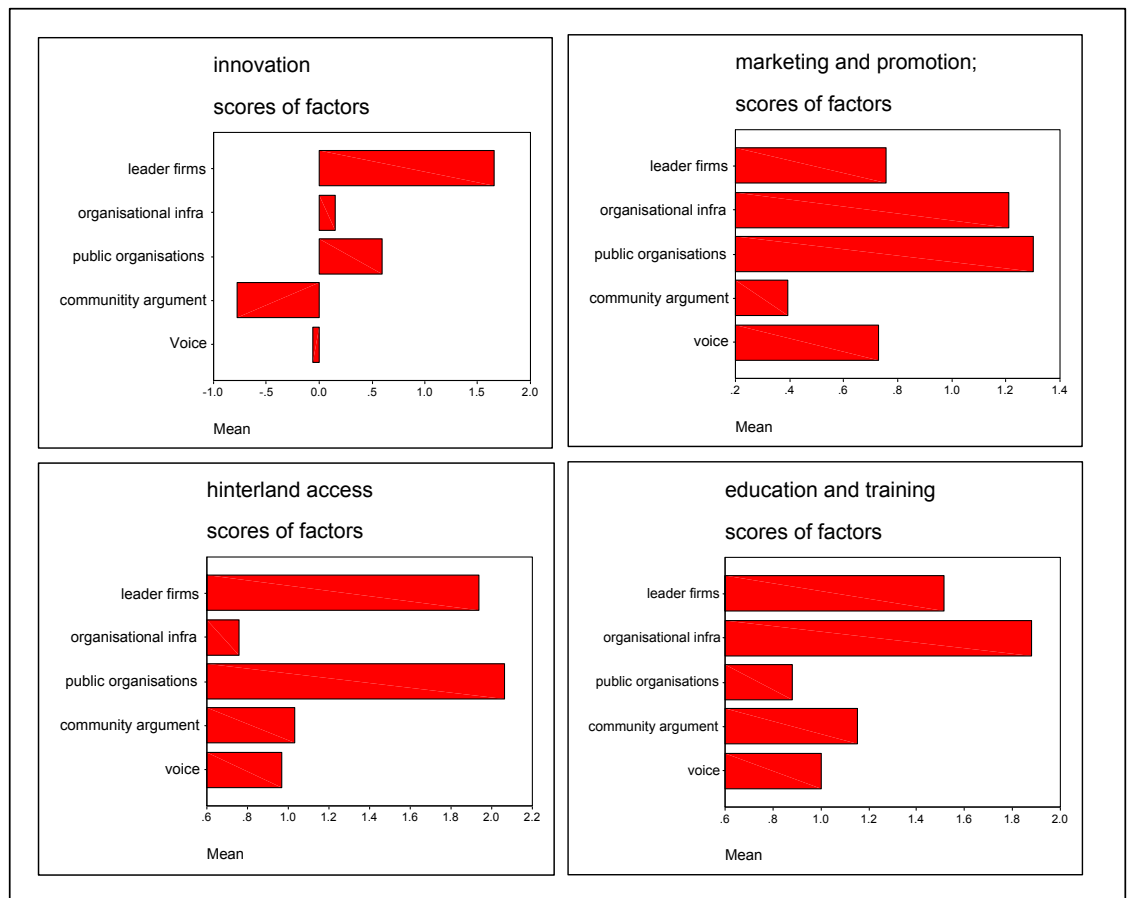
The activities of different actors in the port cluster of Rotterdam are summarised in table 10.

Table 10: activities of different actors in the port cluster of Rotterdam

| Regime | Private | Public-private | Association | Public |
|-------------------------|--|--|---|---|
| Marketing and promotion | Individual marketing and promotion efforts | RPPC is an association that is public-privately funded | The Rotterdam port promotion council (RPPC), organise business trips and hosts guests of the port. | Rotterdam representatives Public funding of RPPC |
| Training and education | Company schools (ECT and Shell used to have a school, but outsource training and education). However, firms do a lot of 'hands-on training' in-house | Education centre EIC is financed by public and private actors to provide schools with information and education of the port industry. KMR aims to improve the knowledge and education infrastructure in the port of Rotterdam | Deltalinqs, the association of port firms, invest in EIC and a 'university chair port economics' | Rotterdam Transport Schools (RTS) is a cooperation of four major providers of port and transport related education in Rotterdam |
| Hinterland access | Firms operating trucks, rail shuttles and barges ECT investing in inland nodes | PCR-RIL, institution to improve the efficiency of services to hinterland modes | Lobby activities of various associations, including Deltalinqs | Investment by the port authority in hinterland terminals in Hungary Strategic partnerships with inland nodes |
| Innovation | Some firms invest in innovations. Especially for small and medium sized firms, investment in innovation is limited. | Connekt, an organisation that encourages and provides incentives for innovations in the transport industry. | Deltalinqs has a limited involvement in stimulating innovations | The port authority encourages innovation of firms, but does not provide direct incentives |

Table 10 shows that for these four ‘regimes’, various cooperative initiatives have been taken. This validates the expert judgements that these issues are collective action problems in the first place. The fact that a number of cooperative initiatives have developed does not imply that solutions to CAP’s are effective. In figure 3, for each regime, the five variables discussed in section 2 are evaluated, on a scale from -5 (very bad) to +5 (very good).

Figure 3: the scores of four regimes in Rotterdam’s port cluster



These results indicate that the solutions to the four CAP’s are judged as moderate. With regard to innovation, the quality of leader firms is judged as good, whereas the infrastructure for collective action and the community argument (willingness to participate in collective innovation projects) are evaluated negatively. For marketing and promotion, the organisational infrastructure (RPPC) and the role of the public organisations are positively evaluated. With regard to hinterland access, especially the low score of the organisational infrastructure is worth mentioning. The organisational infrastructure for training and education is evaluated more positively.

Compared to both Hamburg and Antwerp, the respondents judge the quality of solutions for collective action problems is relatively poor (see table 11).

Table 11: solutions to CAP's: evaluation of the experts

| | Rotterdam | Antwerp | Hamburg |
|--------------------|-----------|------------------|---------|
| solutions to CAP's | 1.0 | 2.2 ^b | 1.6 |

4.6 The role of the port authority in Rotterdam

The Rotterdam municipal port authority (RMPM) is a public landlord port. The organisation formally is a part of the municipality Rotterdam but operates to a large extent autonomously. Currently, a modification of the institutional structure, to grant the port authority more autonomy, and to change the monitoring and control function from the city council to an independent board of directors is discussed. However, even when the suggested new structure is approved, the municipality will remain the major shareholder.

The 'mission' of the port authority shows the ambition to operate as a cluster manager: 'To strengthen the position of Rotterdam's port and industrial complex in a European context, in the short and long run' (RMPM, 2001, translation by author). RMPM invests yearly about 140 million EURO in the port, and has a turnover of approximately 340 million EURO. RMPM generates income from port dues and land lease. Table 12 shows an overview of investments of the RMPM. These include investments in training and education, innovation and hinterland nodes. The majority of the investments are not feasible in the narrow sense: costs exceed revenues of the port authority. This shows that RMPM does not act as a profit maximising landlord, but rather as a cluster manager.

Table 12 investments of RMPM

| Cluster Investments | Investments RMPM |
|--|---|
| Basis physical infrastructure | |
| Dredging | RMPM finances and tenders the dredging of the port basins |
| Quay construction | RMPM invests in quay construction. Investments fluctuate yearly but are substantial |
| Land reclamation and development | Substantial investments, major project for the next decade is the second Maasvlakte |
| Rail and barge service centres | Investments for a large scale facility are under consideration |
| Safety infrastructure | RMPM invests in traffic control |
| Inter terminal transport infrastructure | RMPM is involved in plans to develop dedicated interterminal infrastructure |
| Port re-development | Substantial investments including 2000 short (85 mln EURO) and Fruitport (55 mln EURO) |
| Advanced physical infrastructure | |
| Hinterland terminals (dry ports) | RMPM owns a number of rail terminals in Hungary and Slovakia |
| Industrial pipeline infrastructure | RMPM owns a number of pipelines in the port |
| Warehousing facilities | RMPM does not invest in warehousing facilities |
| Distribution zones | Investments in distribution zones, last one was in distripark Maasvlakte (>40 mln EURO) |
| Cargo handling equipment | No investments |
| Dedicated freight transport systems | No investments |
| Dedicated cargo handling facilities | Co-investments in dedicated all weather facility |
| Facilities to intensify land use | Co-investments in subterranean storage (incidental) |
| Co-siting and equipment sharing | No investments |
| Port services | |
| Energy and water supply | No investments, energy and water are supplied by other firms |
| Waste collection | Waste collection to be paid with flat fee component of port dues |
| Towage services | No investments |
| Security | Investments in securing the distriparcs |
| ICT infrastructure | |
| Web-based port community system | Substantial investments |
| Port information system | Substantial investments in portal portofrotterdam.com |
| ICT system for commodity trade | No investments |
| Attract economic activities | |
| Venture capital provision | Co-owner of a venture capital fund |
| Office space provision for SMSF's | Co-owner of office buildings for port activities |
| Real estate investments in port area | No investments |
| Marketing and promotion of the port | |
| Acquisition of firms | A network of Rotterdam representatives and 'Rotterdam based' acquisition staff |
| Promote innovation | |
| Innovation platforms | No investments |
| Co-finance joint research projects | RMPM co-finances Connect |
| Improve quality of workforce | |
| Labour pool | No structural contribution to the labour pool, last year an incidental contribution |
| Training and education infrastructure | Investments in schools and universities |
| Recruiting and promotion | RMPM visits schools to promote the port |

5 CONCLUSIONS

In this paper we argue that an analysis of the governance in port clusters adds to our understanding port competition, port development and port performance. We have presented an analytical framework for analysing (port) cluster governance. The quality of the governance of a cluster depends on the level of transaction costs in a cluster and the 'scope of coordination beyond price'. Four variables influence both: the presence of leader firms, the presence of intermediaries, the level of trust and solutions to collective action problems. Cluster governance can be evaluated by analysing those four variables. In this approach, port authorities are no longer centre stage; they do play an important role in the governance of the cluster, but their role is interrelated with the activities of private firms, associations and public-private organisations. The scope of activities of the port authority has thus to be analysed in this broader framework.

The goal of port authorities in the governance of clusters in many seaports is to strengthen the competitiveness of the port cluster. Furthermore, the port authority has the resources to invest in enhancing this competitiveness. For this reason, port authorities can be conceived as 'cluster managers', even though of course, they are not the sole actor involved in cluster management. This cluster manager perspective seems a fruitful one to analyse the behaviour of port authorities, and more illuminating than more classical models that focus on ownership and control of cargo handling facilities.

The cluster governance framework is applied to the port cluster of Rotterdam. Through semi-structured interviews with port experts, the opinions of those experts with regard to a wide number of cluster governance issues have been collected. The empirical results validate the relevance of the cluster governance approach. Further empirical results include:

- the role of forwarders as intermediaries in port clusters cannot be overestimated. They are by far the most import intermediary in the port cluster;
- leader firms can make an important contribution to the quality of cluster governance. Rotterdam, Hamburg and Antwerp are relatively well endowed with leader firms;
- trust is the prime determinant of the quality of cluster governance. According to the port experts the level of trust in Rotterdam's port cluster is significantly lower than in both Hamburg and Antwerp;
- collective action problems are relevant in seaports. The most important CAP is the hinterland accessibility, other relevant CAP's are innovation, training and education and marketing and promotion;
- in an overall comparison of the quality of cluster governance between three competing ports (Rotterdam, Antwerp and Hamburg), port experts from Rotterdam judge Antwerp as a port cluster with the best governance, significantly better than both Rotterdam and Hamburg.

We claim that the framework and empirical results presented in this paper provide a basis for further empirical research. Among the interesting research avenues are: a comparative analysis of port clusters, a comparative analysis of the roles of port authorities as cluster managers and an analysis of the role of leader firms in port clusters, with special attention for the possible roles of leader firms in ports in developing nations.

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