

Weakest link or strongest node? Comparing governance strategies for inland ports in transnational European corridors



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ABSTRACT

Inland ports are becoming more important in enhancing hinterland accessibility of deep-sea ports. Their increasing size and number can however also pose a threat to quality of life in adjacent urban regions, for spatial conflicts between port and urban functions may arise. Therefore, inland port governance strategies are needed. The aim of this paper is to reflect on the findings of an international comparison of municipal governance strategies for inland port development in four different countries along the Rhine–Alpine Corridor. Our findings reflect the difficult position of inland ports relative to urban functions within a densely populated corridor. Sufficient capacity is needed to prevent the occurrence of bottlenecks on links and in nodes, which could limit flows on other parts of the corridor. Increasing inland port capacity should however also be aligned with policy measures in urban regions, to avoid the overlapping of inland port and urban functions which could lead to mutually exclusive land-uses. This poses challenges in terms of inland port governance. We observe that cases in which the port and urban administrations open up the policy process to relevant private stakeholders and the civil society, integrated governance strategies for inland port development are more likely to emerge.

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1. Introduction

Over the last decades, global freight transportation has expanded considerably, largely resulting from globalisation processes and increasing economies of scale. These growing global volumes are putting pressure on the design and operation of the European transport network. For instance, the emergence of Asian and Latin-American producer and consumer markets on a global level impacts the spatial allocation of freight movements on the European regional level. This reallocation is resulting from differing criteria companies adhere to for port selection and routing (Monios & Wang, 2013; Wilmsmeier, Monios, & Pérez-Salas, 2014). These changing freight volumes have a direct impact on the demand for capacity and accessibility of the nodes, links and supply chains in the European transport network.

In particular, attention to inland ports is growing, both in policy (e.g. INE, 2014 and in academia (e.g. Raimbault, Jacobs, & Van Dongen, 2015; Monios & Wilmsmeier, 2012; Rodrigue, Debie, Fremont, & Gouvernal, 2010). It is often stated that inland ports are becoming more important factors in the evolution of port systems. We define inland ports as hinterland locations with a waterway connection to a deep-sea port by

means of a corridor (cf. Rodrigue et al., 2010). As global freight transportation is increasing, deep-sea ports have to expand themselves (which often is problematic because of local land-use constraints) and have to divert the incoming flows along transnational corridors towards inland ports, or a combination of both (Monios & Wilmsmeier, 2012; Rodrigue et al., 2010). This is particularly true in the European context of path-dependent development, where vacant space in deep-sea ports is relatively scarce and where in many cases different institutional structures overlap leading to increased bureaucracy (Van Den Berg & De Langen, 2011). Hence, attention to inland port development is growing.

At the same time, however, inland ports themselves are also facing increasing land-use constraints, complex actor constellations, institutional fragmentation, etc. (e.g. Raimbault et al., 2015; Wilmsmeier & Monios, in press). Thus, the increasing development of inland ports can also pose a threat to efficient transnational corridor development, especially when inland ports are adjacent to urban regions, as is often the case in Europe. Sufficient capacity in inland ports is needed to prevent the occurrence of bottlenecks along transnational corridors, but increasing inland port capacity should also be aligned with policy measures on the urban and regional level, to avoid competition of inland port and urban functions, which could lead to conflicts with respect to land-use, economic development and quality of life (Daamen & Vries, 2013; Wiegmans & Louw, 2011). This poses challenges for the governance of inland ports. This is especially relevant since ownership and governance structures of inland ports can vary considerably (Rodrigue

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et al., 2010), as is also the case in the context of deep-sea ports (see e.g. Worldbank, 2007).

Although inland ports are becoming more acknowledged as a research focus in the academic debate, limited attention has been paid to the conflicting port and urban functions in inland ports (Witte, Wiegman, Van Oort, & Spit, 2014). A systematic overview of inland port governance strategies (in particular at the level of the transnational corridor) is lacking. This paper tries to fill this gap by providing an international comparison of municipal governance strategies for inland port development in four different countries along the Rhine–Alpine Corridor (Rotterdam–Genoa). This paper aims to broaden the understanding regarding the pivotal role of inland ports within the complex and overlapping hinterlands of deep-sea ports by exploring the extent to which municipal governance strategies regarding the integration of port and urban functions in inland ports are similar and/or differ between countries along a transnational corridor.

The paper is structured as follows. In the next section, a literature review on inland port development in relation to European corridor development is presented, paying particular attention to the growing importance of the spatial and institutional dimension of inland port development. This results in indicators to explore the governance strategies of inland ports along the Rhine–Alpine Corridor. Case study areas along this transnational corridor are introduced to zoom in on the most important spatial and institutional aspects of inland port development strategies. In the final section, the prospects for inland ports are discussed in the light of recent European policies on transnational corridor development.

2. Theorising on inland port development

2.1. Inland ports in relation to transnational corridor development

The gap between the growing attention to port geography (Ng et al., 2014) and the – up to now – limited attention that is paid to the spatial, economic and institutional dimensions of inland ports is surprising (Raimbault et al., 2015). Still, Rodrigue et al. (2010) and Monios and Wang (2013) provide some useful guidelines to define the scope and nature of the inland port concept. In particular, there should be a link with the handling of containers, a link with a deep-sea port by means of a corridor and some critical mass to achieve economies of scale. They also define three geographical levels: inland terminal, inland port and hinterland. However, the terminal is often in the inland port and the terminal is also often identical to the inland port level itself. Thus, there is a high degree of variation in the definitions used. This paper is mainly concerned with the pivotal role of inland ports in transnational corridors.

The starting point to explain the current state of port system evolution is the notion of port regionalisation (Notteboom & Rodrigue, 2005). Typical of port regionalisation is the reorientation of freight distribution from the deep-sea ports to favourable locations in the hinterlands. For inland ports, this implies that they might function as satellite areas to relieve the congested deep-sea port areas. When these inland ports are located within a transnational corridor, they might also benefit from a corridor's cluster advantage for bundling cargo volumes. Moreover, Wilmsmeier, Monios, and Lambert (2011) have suggested that as hinterlands of different deep-sea port areas are to an increasing extent overlapping, inland ports can potentially have an important role as active nodes in shaping the transportation chain within largely static corridors. Governance has an important role to play here, for although regionalisation is to a large extent dependent upon the preferences of individual shippers and logistics companies, inland port authorities and governments can still play an active role in trying to shape or guide the regionalisation process. The extent to which European inland ports deploy such governance strategies is explored in this paper by focussing on five different case study areas in the European inland navigation network.

In recent years, the academic attitude regarding the positioning of inland ports in the hinterland of deep-sea ports is shifting from a dependent role of inland ports relative to their maritime counterparts (Outside-In) towards a more independent positioning of inland ports, where development is driven from the inland port itself (Inside-Out). This shift can be observed in practice, as Rodrigue et al. (2010) indicate that different actors, such as inland port authorities, rail operators and logistics service providers have seized the opportunity to capture revenue and generate employment, leading possibly to an oversupply of port capacity in inland ports in the European transport network, in particular in the Rhine delta. Wilmsmeier et al. (2011) call for more strategic planning regarding the allocation of inland ports in Europe in this respect. Monios and Wilmsmeier (2012) also draw attention to the spatio-temporal development directions of inland ports in the hinterland and that the drivers of development (which in our view not only include factors, but also actors) are up to now insufficiently understood. This calls for a more integrated institutional approach regarding inland port development, which also is sensitive to the spatial and institutional structure of inland ports within transnational corridors. This is dealt with in the next paragraph.

2.2. Spatial and institutional structure of inland ports

A relatively new and under-researched part of the evolution of port systems is the spatial and institutional structure of inland ports (Ng et al., 2014). Traditionally, deep-sea port authorities deploy hinterland strategies because of the importance of inland terminals for the competitive position relative to other deep-sea ports (Van Den Berg & De Langen, 2011). Yet, at the same time these deep-sea port authorities often find themselves unable to exert a great influence in the hinterland far beyond their own perimeters (Monios & Wilmsmeier, 2013; Raimbault et al., 2015). In other words, actors in inland ports, like deep-sea port authorities, can be equally strong and powerful partners in the hinterland. In this respect, deep-sea port authorities are 'just' one of the other players in the field; they encounter institutional barriers (e.g. network collaboration of inland ports who are 'joining forces' and formal rules or regulations at the hinterland location) in influencing the directional development of inland ports. Also, deep-sea container terminal operators (such as Hutchison Whampoa through the ECT in Rotterdam) tend to increase their influence in the hinterland via inland terminals. Thus, there is a multitude of actors and institutions involved in port development. Ng, Padilha, and Pallis (2013) for instance also point at the impacts of institutions both in strengthening and in negatively affecting the position of dry ports in Latin-America. According to Monios and Wilmsmeier (2012), the relation between institutional issues and spatial development is not well understood in the context of inland ports.

In the context of deep-sea ports, in contrast, spatial and institutional characteristics are much better understood (Ng et al., 2014). Wiegman and Louw (2011) refer to the emergence of port–city challenges, resulting from the expansion of deep-sea ports to accommodate increasing cargo volumes. At the same time, cities are expanding in former port areas by means of, for instance, residential waterfront development. As a result, port and urban actors have competing land-use claims in the same area, leading to intertwining spatial, environmental and port systems. Hence, port–city challenges emerge. Daamen and Vries (2013) further develop the idea of port development versus waterfront development. They focus their attention especially on the institutions and governance processes behind spatial projects in port cities. Witte et al. (2014) have tried to translate the concept of port–city challenges to the context of inland ports and have zoomed in on multi-level governance strategies of municipalities hosting an inland port. They found that imbalances between positive and negative externalities often occur in the context of inland ports, and that multi-level governance strategies are not easily formulated and implemented.

Raimbault et al. (2015) have added to the inland ports debate a nuance regarding the Inside-Out, Outside-In conceptualisation of

Wilmsmeier et al. (2011) and Monios and Wilmsmeier (2012). They project the Inside-Out, Outside-In approach as a dichotomy of development trajectories, because they argue that Inside-Out and Outside-In can be at play simultaneously. Instead, they suggest applying a relational perspective towards inland port development. This allows analysing not only the differing institutional contexts of inland port development, but also the actor-specific practices and processes across territorial scales. The increasing focus on actor practices in port development was already visible in the context of deep-sea ports (Wilmsmeier & Monios, in press). This shift in focus also implies a broader understanding of governance; not only referring to coordination problems within the logistics chain, but also sensitive towards the governance capacity in terms of balancing the interests of port development relative to regional-economic development and spatial development between different types of stakeholders (public, private and civil). We use this broader understanding of governing inland ports and also highlight the spatial and economic dimensions of inland ports at the international level, as well as the involvement of many different actors in governing inland ports.

2.3. Understanding inland ports: towards indicators

We make use of the American inland port definition of Rodrigue et al. (2010), where an inland port can be viewed as a location in the hinterland with a connection to a deep-sea port by means of a corridor (often via a rail link) and with sufficient critical mass to achieve economies of scale (preferably hosting an inland terminal). We specify this definition for the European context of inland ports development by highlighting the necessity of waterway access (see Wiegmans, Witte, & Spit, 2015 for an elaborated discussion on the difference between American and European understandings of the inland port concept). Within the hinterland, inland ports can have Inside-Out and/or Outside-In driven development or both, which is dependent upon specific factors of an inland port and differing actor constellations within different inland ports. We are particularly interested in the spatial and institutional dimensions of inland ports, for recent literature on port development is to an increasing extent focussing on institutional theories (e.g. Daamen & Vries, 2013; Monios & Wang, 2013; Ng et al., 2014; Raimbault et al., 2015; Wilmsmeier & Monios, in press; Witte et al., 2014).

To further operationalise this, we make use of the conceptual framework of Daamen and Vries (2013), which we try to translate from the deep-sea port context to the inland port context. We understand institutions – the structures and mechanisms of cooperation between individuals or groups – as the total sum of governance structures, laws and regulations in the formal domain, and informal institutional structures such as policy documents and development strategies in the informal domain. This is in line with Scott's (2001) understanding of the regulative pillar of institutions. Following theories of institutionalism, this implies that these formal and informal institutions shape the actions of actors within a particular context. By doing so, for instance, governance processes may be affected by the interplay between actors and institutions. Thus, in this case, we aim to analyse the institutional structures which are possibly shaping port–city challenges in the context of inland port development. Daamen and Vries (2013) are interested in the institutional and spatial aspects of port–city challenges in the context of deep-sea ports. In their paper, they draw attention to three types of institutions which are likely to shape governance processes in the European port–city interface (Table 1). These indicators are taken into account in comparing the different inland port cases in this paper.

3. Inland port development along the Rhine–Alpine Corridor

This paper makes use of data collected in the context of the European NWE INTERREG-IVB programme CODE24, Corridor Development Rotterdam–Genoa (CODE24, 2015). This project has a bottom-up organisation; the inputs to the project have been collected through stakeholders

Table 1
Institutional aspects of inland port development.

Domain	Type	Indicators
Formal	Governance structure	Control of the inland port authority Level of governmental support
	Laws and regulations	Ownership of port-related real estate Environmental- and safety regulations
Informal	Development orientations	Market conditions Spatial conditions Financial conditions

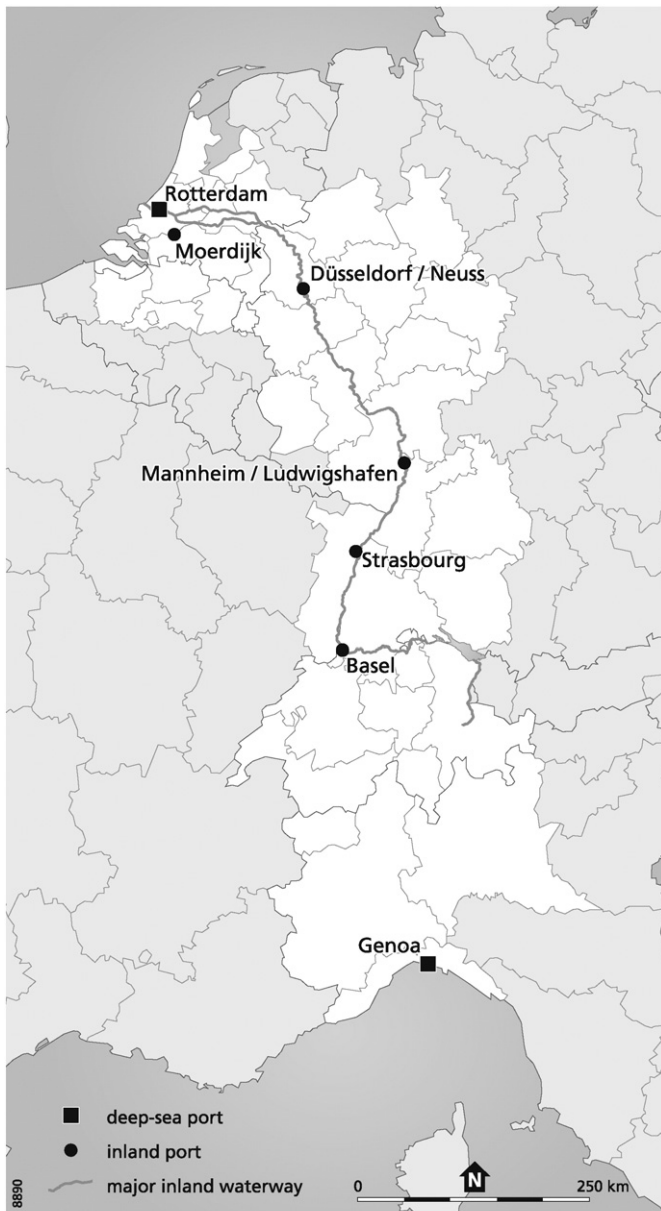
Source: adapted from Daamen and Vries (2013).

and initiatives stemming from the corridor regions themselves. The data of this pilot project were collected in the period from January 2013 to May 2015. The data have been collected in a bottom-up manner, mostly through several CODE24 round table workshops with local stakeholders and external experts. These workshops have been organised in Mannheim, Germany (February 2013; June 2014), Esslingen, Germany (June 2013), Strasbourg, France (April 2013) and Utrecht, Netherlands (July 2014). Main aim of the workshops was to exchange experiences between inland ports along the Rhine–Alpine Corridor. The interested participants included representatives from the City of Mannheim, Port of Mannheim, City of Neuss, Port of Düsseldorf/Neuss, region of Basel, Port of Basel and Port of Strasbourg. The participants presented and discussed the current state of affairs in their respective port development strategies. Utrecht University (Netherlands) and ETH Zürich (Switzerland) participated as observing partners in the workshops.

Additionally to the round table sessions, in the period between April 2014 and September 2014, four semi-structured interviews have been carried out with experts and with representatives from the region of Basel, Port of Basel and Port of Rotterdam. In the period between March 2015 and May 2015 two additional semi-structured interviews were conducted with the director of the Port of Mannheim and Port of Strasbourg. A full report of the pilot project as well documents on the case studies of Basel, Mannheim and Strasbourg can be accessed through the CODE24 online platform (CODE24, 2015). Finally, analyses of port-related policy documentation and municipal- and inland port statistics from public statistical agencies were made to supplement the analyses of the round tables and interviewing. Especially the data for the case study of Moerdijk have been collected through these methods, because Moerdijk was not represented in the before-mentioned round table discussions. The usage of different types of data collection enables to draw conclusions on different development strategies, while still respecting general and common constraints of European inland ports.

The case-study areas (Fig. 1) include Moerdijk (Netherlands), Düsseldorf/Neuss and Mannheim (Germany), Strasbourg (France) and Basel (Switzerland). The key data of the case-study areas are outlined in Table 2. Detailed characteristics of the case-study areas are summarised in Appendix A. The case-study areas are selected keeping in mind the definition and criteria for inland ports by Rodrigue et al. (2010). All case-study areas are located within the densely populated Rhine–Alpine Corridor ranging from Rotterdam to Genoa (Italy). The case-study areas are part of the hinterland network of especially the Port of Rotterdam (although other deep-sea ports in the Hamburg–Le Havre range can consider these inland ports as part of their hinterland as well). All case-study areas have significant volumes of cargo and container throughput and have considerable numbers of direct, port-related employment. With the exception of Moerdijk,¹ the case-study areas are adjacent to major urban regions.

¹ Although Moerdijk has no large-scale urban region in close proximity, it nevertheless represents an interesting case-study area, for the port authority has developed a new port vision (Papa et al., 2012) which is facing heavy local resistance. In addition, the strategic location relative to the Port of Rotterdam and the metropolitan region of Rotterdam–The Hague, and the involvement of the Port of Rotterdam in the future development of Moerdijk make further investigation of this case-study area worthwhile.



Source: authors' own adaptation

Fig. 1. Case-study areas inland port development along the Rhine–Alpine Corridor.

4. Spatial and institutional aspects of inland port development

In this section, the results of the international comparison are presented using the framework of Daamen and Vries (2013). The most important results with regard to the governance structure, the laws and regulations and the development orientations are discussed. In addition, the most important similarities and differences between the cases are highlighted. A full overview of the outcomes of the international comparison is provided in Appendix A.

4.1. Governance structure

The first aspect of interest is the governance structure, in which the control of the inland port authority and the level of governmental support are of main concern (see Appendix A). This is especially related to the question of who governs the inland port. We observe that in all case study areas to a large extent public actors (the port authority and the

municipality) are governing the inland ports. At the same time some forms of cooperation with other actors besides the inland port authority and the hosting municipality of the inland port exist that potentially shape the future governance of the inland ports.

In the Dutch context, in the case of Moerdijk – the largest inland port in The Netherlands in terms of cargo throughput – the port authority of Moerdijk and the port authority of Rotterdam formally signed a joint development contract in 2012 for future cooperation in terms of commercial activities and port operations with regard to knowledge sharing, sustainability aspects and safety measures. In 2014, this resulted in the publishing of a port development strategy (*Havenstrategie Moerdijk 2030*). Also in the German and Swiss contexts, different types of governance structures exist that go beyond the inland port authority and the municipality. In the case of Mannheim – which currently is one of the largest inland ports in the inland navigation network – the Port of Mannheim cooperates with the Port of Ludwigshafen since 2001, which is on the opposite side of the river bank. In the case of Basel – the most important inland port in Switzerland – the different port locations of the Port of Basel cooperate under the umbrella of 'die Schweizerischen Rheinhäfen'.

A special case concerns the Port of Düsseldorf/Neuss – two merged ports south of the Ruhr area in Germany – where a merger of the initial independent ports of Düsseldorf and Neuss was discussed in 1994 because of the pressure of freight transport on the local transport network and the joint interests in redeveloping and integrating four intermodal terminals (which at the time were located in Duisburg, Düsseldorf, Neuss and Krefeld) within a context of scarcity of space for expansion. With a common development vision, the ports could jointly compete with other ports in the European transport network. This form of cooperation was finally formalised in 2003. In 2012, a next step in the development of the Port of Düsseldorf/Neuss was the collaboration with the Port of Cologne (*Köln-Deutz*). Thus, there is strategic cooperation between ports both on an intra- and an inter-regional level: the ports of Düsseldorf and Neuss are merged (intra-regional), whereas the Port of Cologne has a strategic (Outside-In) stake in the development of the Port of Düsseldorf/Neuss (inter-regional).

The Port of Strasbourg – the second biggest inland port in France after Paris – also represents a special case, because the port is under the formal control of the French transport ministry. The instalment of the port authority of Strasbourg (*Port Autonome de Strasbourg*) is distinctively different from the other cases because of the 50% state control. This is partly resulting from the strong centralised management which is typical of France ports (see Worldbank, 2007), but also because of the importance of Strasbourg for France in terms of regional-economic growth and intermodal transport. This is because the port authority has a dual development strategy on container throughput and tourism (river-based passenger transport accounts for nearly 800,000 tourists each year). On the grounds of the dual development strategy, port companies uttered their concerns to the port authority about the urban developments in the former port area. Therefore, the Port of Strasbourg has analysed and communicated current and future logistical needs of the companies located in the port. This provided the input for the current formal development strategy of the port (*Contrat de Développement Ville/Port/CUS*), which outlines the development directions and spatial extensions of both port and city, supervised by the municipality of Strasbourg.

4.2. Laws and regulations

The second aspect of concern is laws and regulations, which in the framework of Daamen and Vries (2013) is mainly restricted to ownership of port-related real estate and environmental- and safety regulations. In the case studies, using a somewhat broader interpretation of the spectrum of laws and regulations, we have found two cases which deal with aspects related to laws and regulations.

Table 2
Key characteristics of the case-study areas.

Inland port–city	Population	Port area (ha)	Throughput in tonnes (2013)	Throughput in TEU (2013) ^a	Direct employment
Moerdijk	1200	2345	18,497,000	150,000 ^a	8371
Düsseldorf/Neuss	D: 594,000 N: 156,000	500	19,100,000	250,000 ^a	23,000
Mannheim	300,000	1131	8,786,000	136,621 ^a	13,000
Strasbourg	272,000	1057	11,000,000	406,399 ^a	10,000
Basel	173,000	159	6,800,000	105,000 ^b	10,000

Source: authors' own adaptation on basis of municipal- and inland port statistics from public statistical agencies, presentations and discussion results of the CODE24 round table workshops, information from inland port authorities' websites and information from port-related policy documentation.

^a Total throughput in TEU.

^b Inland waterway throughput in TEU.

First, in the case of Moerdijk, as a response to the possible expansion of the port at the expense of the town of Moerdijk, a new spatial planning Act (*Moerdijkregeling*) was put in place to assist residents in selling their real estate to the municipality for a reasonable price when they fail to do so at the regular market. The municipality of Moerdijk is also implementing spatial projects such as a community centre for cultural activities as a compensation for the port expansion. This is in line with other forms of compensation planning which have been employed in the case of Moerdijk in the past. Another strategy is the decentralisation of port expansion towards more peripheral locations. For instance, the new logistics park of Moerdijk is planned on a greenfield site near a motorway access point southeast of the existing port area. Although the port itself is still nearby, the site is located relatively far from the existing residential area (which is northeast of the existing port area). In conclusion, what started off as a governance network between the Port of Moerdijk, municipality of Moerdijk and province of Noord-Brabant, in the end resulted in a very formalised planning procedure with many feedback moments towards all stakeholders (Papa, De Gucht, & Hoogenbosch, 2012). Thus, a shift from rather informal (governance network resulting in a joint policy document; *Havenstrategie*) to more formal types of institutional aspects (compensation planning; *Moerdijkregeling*), can be observed.

Second, in the case of Mannheim residential development in the port area is one of the goals of the mayor. However, in the port area many urban functions also exist, which may potentially lead to conflicts (e.g. with neighbouring activities, private car traffic, and noise pollution). In particular, the generation of private car traffic is of concern for the inland port authorities. Therefore, buffer zones are implemented to ensure a minimum distance between conflicting land-uses. Still, in the round table workshops it was discussed that it is probably impossible to achieve further integration due to the presence of the international chemical company BASF, because formal institutional aspects such as the SEWESO-II guidelines are preventing settlement near the chemical industries. In the workshop it was stated that many urban districts are already located on the river banks (e.g. the Rhein-Galerie on the river bank of Ludwigshafen) and that in theory commercial use would further enhance the value of the port area. However, in practice it is not feasible to extend residential areas too far into the port area (e.g. towards the Handelshafen and Industriehafen). This is the case because, for instance, noise nuisance from port activities and increasing impact of private car traffic cause detrimental effects for the residential environment. Thus, in the planning process – that is still ongoing – there has to be very cautious land-use zoning to align the diverging interests of port versus residential development.

4.3. Development orientations

The final aspect which is taken into account is the development orientation of the inland ports in terms of spatial and economic development directions. We observe that informal institutional structures and path-dependent development are important in explaining the different development orientations which we found in the case study areas. The

main findings concerning each case study area are briefly discussed below.

4.3.1. Moerdijk: from strategic planning to compensation planning

Originally, Moerdijk was developed in the 1960s to host part of the petrochemical industries of the Port of Rotterdam. The location decision for Moerdijk was influenced by the stakes that the chemical branch of Shell had in the project. More recently, the Port of Moerdijk, together with the municipality and the province of Noord-Brabant have designed a port development strategy for 2030. The Port of Rotterdam and the University of Antwerp assisted in the creation of this new vision, which can be seen as a form of Outside-In driven development (Papa et al., 2012). The port development strategy has met heavy local resistance. Formal participation projects and feedback surveys with residents could not avoid fierce NIMBY (Not In My Backyard) situations. An independent committee even argued that the town of Moerdijk should be sacrificed to make space for the future expansion of the port. Previous research already indicated that the future spatial development of the port and town of Moerdijk would not be uncontested (Witte et al., 2014). Although some formal laws and regulations have been put in place to resolve the conflicts, the future of the port remains uncertain.

4.3.2. Düsseldorf/Neuss: intra- and interregional cooperation between ports

The decentralisation of a share of the freight transport from Neuss to Cologne (interregional) enabled the redevelopment of some vacant space in the port area of Neuss. At the moment, Neuss is working on residential development near the waterfront in this area (*Neuss rückt näher ans Wasser*). The aim of this effort is to better connect the city to the river Rhine. To this end, a new commercial district is created in between the port area and the mixed-use inner-city area. This commercial area functions as a buffer zone and is designed in such a way that it is possible to view the port area from the inner-city. The redevelopment of this area along the river Rhine has also led to new port activities south of Düsseldorf (intra-regional), where a waste disposal site is planned to be transformed into a new port area (*Reisholz*). Important institutional aspects in the realisation of these plans are the incorporation of port businesses in the planning through mediation by institutions such as the Chamber of Commerce and the inland port authorities. Especially in Neuss, there is a tradition of influential family companies in the development of the port. Such institutions are also important in bridging the gap between the political and commercial spheres.

4.3.3. Mannheim: different scenarios for joint development of port and city

At the moment, the expected growth from the current total throughput in TEU of 300,000 up to 900,000 TEU in 2035 is leading to concerns on the part of the inland port authority with regard to land deficits, employment growth and value-added activities around the port (CODE24, 2015). Therefore, the port authority of Mannheim and the City of Mannheim together launched the master plan study 'Hafen.Stadt.Mannheim 2035 +' for the integrated development of both port and city. The study consists of the identification and evaluation of different scenarios

for the future development of both port businesses and urban activities. The port companies are also involved in the development of the master plan. In the development process, a land-use and site potential analysis have been carried out. These analyses revealed that vacant sites with water access are few and are rather unsuitable for port-related use as long as current adjacent settlements are not also relocated to create more space for logistics activities. Therefore, these brownfield areas could be used instead for further development of housing projects (e.g. residential waterfront projects) or smaller scaled functions related to logistical activities (e.g. administration offices). However, the relatively long distance to the container terminals may limit the potential for a logistical solution. At the moment, scenarios are defined to identify potential locations for an additional container terminal outside the border of the city centre.

4.3.4. Strasbourg: from informal cooperation to a formal development contract

To identify the current and future needs for space, the port companies in the Port of Strasbourg set up a project to map out the land-use claims and site potential in the port. The most important conclusions of the companies were to increase the public awareness of port development, to enhance the efficiency of the local transport network within the port area and to enlarge the attractiveness of the port area. These conclusions, which were derived from a preliminary informal process, have been integrated in the formal development contract between the port, the city and the municipality, in which all different interests have been covered. This contract is now used as a starting point for discussing future issues between the port and the city, supervised by the municipality of Strasbourg. In the round table workshops it was stressed that this form of cooperation, consisting of open dialogue and common goals, has resulted in positive experiences on part of the actors involved. Currently, the port is looking to move its container facility to the Port of Lauterbourg in the north, which will have significant spatial consequences for the transshipment between the various port locations. This is creating space for urban development in the former port area. Also, the port has a spatial development orientation towards the nearby City of Kehl (Germany) and therefore the inland port authority complies with the city authorities of Strasbourg and Kehl to build a better transport connection through the implementation of a new tram line (crossing the port area).

4.3.5. Basel: path-dependent development leads to successful integration

Because of path-dependent development resulting from the special location of Basel near three national borders (Switzerland, Germany and France), many port-related businesses have ended up at locations within the urban districts. This implies that Basel needs to redevelop the port area in an integrated way; there is not much vacant land available, but many areas are suitable for urban transformation. One of the current redevelopment projects is the historic port site of *St. Johann*, which is located close to an old residential district. This port area is redeveloped into a knowledge campus close to the waterfront of the river Rhine. Because of this, some port activity is relocated to the Port of Kleinhüningen in the north and some port activities at existing sites are intensified. In addition, a new container terminal is established in *Basel Nord*. The implementation of the port expansion project in Basel Nord is seen as the most important 'engine' for the future development of the port. To connect this area to the existing port and city, the federal government has announced the creation of a motorway tunnel, to avoid too much pressure on the local urban transport network of Basel. Also, the federal government imposed the City of Basel and the Port of Basel to formulate an integrated development strategy for the creation of the knowledge campus in the Port of St. Johann and the relocation of existing port facilities to the Port of Kleinhüningen.

Although these projects have a large impact on the urban environments, the participants in the round table workshops stressed the importance of informal institutional aspects such as mentality in the case

of Basel. In addition, informal planning instruments such as a test-planning procedure (2009–2010) were applied to better involve the residents in the redevelopment. The residential districts of Kleinhüningen and of Klybeck are enclosed by port activities, but residents are not strongly opposing the neighbouring emissions. This is because these are historical working-class neighbourhoods which have been part and parcel of the port's development in the past century. Understanding the necessity of port development is part of the identity of these neighbourhoods, which explains the high density and integration of port and urban functions in the case of Basel. Still, since the integration is already high, it is also pointed out by the participants that future expansions of either port-, residential- or industrial activities probably is difficult without leading to overlaps between port and urban functions. For the redevelopment of the Port of St. Johann, there was also great political commitment to bring the project to a successful result and both the inland port authority and the inland port companies supported the joint goal of the project. The participants of the round table workshops also put forward the important role of the federal government in this respect. They mediated between the actors involved by pointing at the joint goal, and they provided a nation-wide plan for the development of terminals, which helped in structuring the discussion.

4.4. Synthesis: common problems, different governance strategies

A commonality running through the case-studies is that all port cities are facing the challenge to balance port and urban development. Especially given the diverging governance structures between the ports (see [Appendix A](#)) and the different balances between public and private involvement that exist within the ports, this raises some dilemmas. Inland port authorities deem further development of their activities vital to ensure regional-economic growth. This is problematic, because port sites are often located close to urban districts, while urban governments look to redevelop former industrial sites in the port area for recreational or residential uses due to ongoing population growth and inner-development strategies. At the same time this is also creating problems, because such redevelopment projects are reducing the suitability of the existing port area to facilitate cargo handling. This is even more critical in a context of uncertain growth scenarios of the Port of Rotterdam. While the growth estimates have been positive for a long time, recently the export of the Port of Rotterdam on the Rhine is relatively shrinking relative to previous years ([Paardenkooper-Süli, 2014](#)). These dilemmas and uncertain future scenarios potentially lead to conflicts, for instance with regard to noise emissions in residential districts which are related to port activities. The common response in the case-study areas either is to relocate part of the port activities towards more peripheral locations surrounding the city (decentralisation), or to strive for an integrated and balanced port development strategy, which considers both port requirements and interests of urban development at an early stage.

In doing so, the port cities all seek forms of cooperation which transcend the local level and the institutional boundaries of the inland port authorities and cities. In some cases, this leads to Outside-In driven types of development, for instance the involvement of the Port of Rotterdam in the Port of Moerdijk and the stake of the Port of Cologne in the Port of Düsseldorf/Neuss ([Table 3](#)). This confirms the notion of [Van Den Berg and De Langen \(2011\)](#) that deep sea port authorities try to influence the hinterland beyond their own perimeters. At the same time, however, cases of Inside-Out driven development, where the inland ports themselves are active in trying to shape the hinterlands and supply chains, were also observed. For instance, in the cases of Düsseldorf/Neuss, Mannheim, Strasbourg and Basel, intraregional cooperation with nearby smaller ports was observed ([Table 3](#)). From these findings it can also be concluded that both types of development can be at play at the same time, which is in line with the suggestions of [Raimbault et al. \(2015\)](#).

Table 3
Directional development of inland ports along the Rhine–Alpine Corridor.

Inland port–city	Outside-In	Inside-Out
Moerdijk	Port of Rotterdam	
Düsseldorf/Neuss	Port of Cologne	Port of Reisholz
Mannheim		Port of Ludwigshafen
Strasbourg		Port of Lauterbourg
Basel		Port of Kleinhüningen

Source: authors' own adaptation.

While the problems of the port cities are common, spatial and institutional differences exist between the port cities which lead to different processes and different outcomes in every case. In Moerdijk, the informal process to arrive at a joint development vision has not led to alignment among all actors besides the port, which is illustrated by the fierce NIMBY protests. Therefore, new formal laws and regulations as well as forms of compensation planning have to be introduced to ease the conflict. In contrast, in the cases of Düsseldorf/Neuss, Strasbourg and Basel, informal institutions such as family port businesses, test-planning procedures and mediation actors have proved to be strong, leading to the development of jointly concerted plans. In Düsseldorf/Neuss and Strasbourg, port companies have been involved in the planning process from early on. In Basel, the path-dependent or integrated development of port and city has led to almost non-existent opposition among the residents for port expansion. In Mannheim, the planning process is in its final stages. Private companies are involved in the process and a quantitative analysis of land-use and site potential has identified the suitability of locations for integrated port and urban development. However, formal regulations and practical constraints may hamper successful co-evolution of port and city in the near future. Think for instance of the limited space for expansion and the difficult zoning. Still, it seems that in cases in which the port and urban administrations open up the policy process to relevant private stakeholders and the civil society, integrated governance strategies for inland port development are more likely to be successful. At the same time, however, caution is needed when trying to copy success factors of one port to a different context. Especially given the spatial and institutional differences mentioned before, it can be concluded that what works well for one port, does not necessarily work well for others.

5. Implications for scholarly knowledge and managerial practice

This paper has explored the extent to which governance strategies regarding the integration of port and urban functions in inland ports are similar and/or differ between countries along a transnational corridor. We have reflected on the findings of an international comparison of governance strategies for inland port development in four different countries along the CEF Rhine–Alpine Corridor (Rotterdam–Genoa). By doing so, we add to recent *scholarly knowledge* regarding spatial and institutional aspects of port development (Ng et al., 2014), the

positioning of inland ports in the hinterland of deep-sea ports (Raimbault et al., 2015; Wilmsmeier & Monios, in press) and transnational corridor development (Witte et al., 2014). These fields of interest are often isolated from each other in the *scholarly debate*, but this paper attempts to integrate them. This approach has enabled us to analyse institutional structures which are possibly shaping port–city challenges in the context of inland port development along a transnational corridor.

Our findings reflect the difficult position of inland ports within a densely populated corridor. All port cities in our analysis seek forms of cooperation which transgress the local level and the institutional boundaries of the inland port authorities and cities to deal with conflicts between port and urban development. This poses challenges for the governance of inland ports and we observe different ways of dealing with these conflicts. First, in some cases (Moerdijk, Düsseldorf/Neuss) cooperation with other deep-sea and inland ports at the interregional level exist that goes far beyond the port's immediate surroundings, while in other cases (Mannheim, Strasbourg, Basel) ports seek collaboration with smaller ports at the intraregional level. Second, we observe different types of institutions which influence the outcomes. In the case of Moerdijk, formal regulations have to ease port–city tensions which could not be overcome in the informal domain. In the cases of Düsseldorf/Neuss, Strasbourg and Basel, however, strong informal institutions have proven to be powerful in leading to successful joint development plans. We therefore conclude that cases in which the port and urban administrations open up the policy process to relevant private stakeholders and the civil society, integrated governance strategies for inland port development are more likely to emerge. These outcomes can be relevant for *managerial practice*, for instance in the light of European policies on transnational corridor development, such as the renewed attention to bottlenecks in the core network corridors of the Connecting Europe Facility, and the recent instalment of the first corridor-wide European Grouping for Territorial Cooperation (EGTC); the Interregional Alliance for the Rhine–Alpine Corridor. Although transnational corridor development is high on the European agenda, further insights on spatial and institutional aspects of inland port development are necessary. Additional research on these topics is needed to prevent strong nodes from turning into weak links.

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Appendix A. Main findings of the international comparison

Inland port–city	Port of Moerdijk	Port of Düsseldorf/Neuss	Port of Mannheim	Port of Strasbourg	Port of Basel
Country	The Netherlands	Germany	Germany	France	Switzerland
Province/region	Noord-Brabant	Nordrhein-Westfalen	Baden-Württemberg	Elsass	Basel-Stadt
Surface city area (km ²)	18	Neuss: 99 Düsseldorf: 217	145	78	37
Number of residents on the city level (2013)	1200	Neuss: 156,000 Düsseldorf: 594,000	300,000	272,000	173,000
Number of residents on the metropolitan level (metropolis in brackets)	2,260,000 (Metropoolregio Rotterdam–Den Haag)	5,080,000 (Regierungsbezirk Düsseldorf)	2,300,000 (Metropolregion Rhein-Neckar)	868,000 (Eurodistrikt Strasbourg–Ortenau)	731,000 (Metropolregion Basel)

(continued on next page)

Appendix A (continued)

Inland port-city	Port of Moerdijk	Port of Düsseldorf/Neuss	Port of Mannheim	Port of Strasbourg	Port of Basel
Direct employment in the port area	8371	23,000	13,000	10,000	10,000
Total surface port area (ha)	2500	500	1131	1057	159
Throughput in million tonnes (2013)	18.5	19.1	8.8	11.0	6.8
Throughput in TEU (2013)	150,000 (total throughput)	250,000 (total throughput)	136,621 (IWW only)	406,399 (total throughput)	105,000 (IWW only)
Governance structure					
Control of the inland port authority (public/private); level of governmental support	Shared by the province of Noord-Brabant and the municipality of Moerdijk	Shared by City Ports Neuss and City Development Consortium Düsseldorf (regional authority of Baden-Württemberg [55%], City of Düsseldorf [25%] and regional authority of Cologne [20%])	Owned by the regional authority of Baden-Württemberg, represented since 1990 by the port authority of Mannheim	Shared by the City of Strasbourg (50%) and the national state of France (50%) since 1924	Shared by the regional authorities of the City of Basel and the region of Basel
Representation of the interests of port businesses (private)	Port association BIM	Port association Düsseldorf	Passive port association, represented by the inland port authority	Port association (joint interests of port companies since 50 years)	Confederation of port companies, regulators, representation of passenger transport and trade union
Laws and regulations					
Ownership of port-related real estate (public/private)	Port authority of Moerdijk	Port authority of Neuss/Düsseldorf	Regional authority of Baden-Württemberg, represented by the port authority of Mannheim	Port authority of Strasbourg	Regional authority of Basel, represented by Swiss Rhine Ports
Expansion areas for city development	None; brownfield redevelopment and compensation planning	Düsseldorf: Medienhafen (implemented) Neuss: historical port area of Port of Neuss (planned)	Inland waterway connection (25 ha, implemented)	Joint development of two river basins (planned)	Port of St. Johann
Expansion areas for port development	Logistiek Park Moerdijk (planned)	Port of Reisholz (35 ha, planned)	Inland waterway connection (25 ha, implemented)	Port of Lauterbourg (planned)	Port area Kleinhünigen
Development orientations					
Points of attention	Cooperation with Port of Rotterdam	Cooperation with Port of Cologne	Cooperation with Port of Ludwigshafen	Development of a terminal for leisure-based inland navigation activities	Only inland port of Switzerland; absence EU membership implies different property regulations; throughput of 60% by rail in port area of Kleinhünigen
Port-city challenges	Land claims in port area; noise vulnerability residential district	Land claims in port area; noise vulnerability residential district; bottlenecks in modal transshipment barge/rail	Land claims in port area; noise vulnerability residential district; bottlenecks in modal transshipment barge/rail; freight pressure in urban transport network; lack of a common interest group of port operations	Land claims in port area; noise vulnerability residential district; lack of a common interest group of port operations	Land claims in port area; noise vulnerability residential district; freight pressure in urban transport network operations
Development orientations for governing port-city challenges	Decentralisation of port expansion towards more peripheral locations; compensation planning for residents; public relations	Architectural 'showcase' design to better connect city and port; industrial buffer zone between port area and residential district; decentralisation of container handling towards new bi-modal terminal; maintenance and expansion of port facilities; public relations	Joint development strategy Hafen.Stadt.Mannheim 2035+; public relations; organisation of community and cultural events in the port area	Joint development contract port and city; industrial buffer zone between port area and residential district; enhancing accessibility; architectural 'showcase' design to better connect city and port; external consultancy; maintenance and expansion of port facilities; public relations	Close connection between port and urban development; port development in Port of St. Johann financed through public-private partnership; vertical coordination and optimization of port operations

Source: authors' own adaptation on basis of municipal- and inland port statistics from public statistical agencies, presentations and discussion results of the CODE24 round table workshops, information from inland port authorities' websites and information from port-related policy documentation.

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