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An evolutionary perspective on regional port systems: the role of windows of opportunity in shaping seaport competition

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Abstract. How do seaports evolve in relation to each other? Recent studies in port economics and transport geography have been focused on how supply-chain integration has structurally changed the competitive landscape in which individual ports and port actors operate. Port regionalization has been addressed as the corresponding new phase in the spatial and functional evolution of port systems. However, these studies lack theoretical foundations that allow us to assess empirically the role either of the institutional context or of strategic agency in the competitive (spatial and functional) evolution of regional (integrated) port systems. The authors present an evolutionary framework to analyze the development of seaports in a regional context by making use of the concept of 'windows of opportunity'. The role of seaport-based evolution in the processes aimed at positioning market players and ports on the container scene in the Rhine – Scheldt Delta is examined.

1 Introduction

Over the last decade scholars of port economics and transport geography have been occupied with the strategic role of seaports within increasingly global integrated supply-chain systems (Heaver, 1995; Jacobs and Hall, 2007; Notteboom and Winkelmans, 2001; Robinson, 2002; Slack, 1993; Slack et al, 2002). As a derived demand, maritime transport and the shipping sector evolved along an emerging global division of labour based upon the principles of 'the integration of trade and disintegration of production in the world economy' (Feenstra, 1998). The maritime transport sector, in particular through its mass application of the container since the late 1980s, has indeed been a key facilitator of the process of global economic integration (Levinson, 2006). At the same time, processes of integration and market consolidation in the shipping industry have altered the strategic competitive landscape of seaports. In response to these observed changes, scholars have addressed the process of port regionalization as a new phase within port systems development (Notteboom and Rodrigue, 2005). What is less well documented empirically is how this process of regionalization unfolds and what the role both of agency and of institutions is within this evolutionary process. In this paper we aim at understanding the evolution of regional port systems by making use of conceptual insights from both institutional and evolutionary approaches within economic geography. As such, we respond to calls from scholars for rebuilding the theoretical and empirical connections between transport and economic geography (Hall et al, 2006). In particular, we draw upon the conceptual model of Buitelaar et al (2007), in which *windows of opportunity* open and close at certain locations through deliberate collective action, helping to analyze the process of institutional evolution. By adding a relational dimension to the perspective of Buitelaar et al, and applying it to the specific case of a region's

evolution in container-port development, we hope to make an empirical and conceptual contribution to the recent agenda [*Economic Geography* 2009 **85**(2)] of synthesizing institutional and evolutionary approaches into a geographical political economy.

The central question of this study is: *how do seaports evolve in relation to each other?*

The structure of this paper is as follows. First we critically discuss the concept of windows of locational opportunity as it has been developed within the emerging domain of evolutionary economic geography. This is followed by an overview of the evolution of ports within an increasingly integrated transport sector, in section 3. In section 4 we present our evolutionary perspective on the development of regional port systems, by building on the work of Buitelaar et al (2007). This perspective is then applied to three interrelated empirical cases.

2 Evolutionary economic geography and windows of locational opportunity

Recent debates among economic geographers gravitate around formulating synthesis between evolutionary and institutional economic geography (Grabher, 2009). Although this paper is not the place to repeat much of what has been written on institutional and evolutionary approaches in economic geography [see Amin (2001) and Martin (2000) for an overview on institutional approaches; see Boschma and Martin (2010) and Coe (2011) for an overview on evolutionary economic geography], we want to address the state of the debate as the starting point for further theoretical understanding of the evolution of regional port systems in terms of so-called windows of opportunity.

In response to the emerging evolutionary economic geography (EEG) approach developed over the last decade (Boschma and Frenken, 2006; 2009; Boschma and Lambooy, 1999; Martin and Sunley, 2007; Rigby and Essletzbichler, 1997), Mackinnon et al (2009) addressed a 'sympathetic critique' to EEG by taking on board *power, social agency, and territorial institutions* more explicitly in understanding regional economic development outcomes. As such, they favour a geographical political economy framework in which evolutionary thinking in economic geography can progress (Pike et al, 2009). One concept within EEG that, according to Boschma and Frenken (2009), can potentially incorporate the addressed critique is that of 'windows of (locational) opportunity'.

The concept of windows of locational opportunity has been developed (Boschma, 1997; Storper and Walker, 1989) to describe locational dynamics of firms in new and emerging sectors. It is argued that innovation and new industries are likely to emerge and develop independently of established spatial structures. This is because at the beginning of a new industry or technology there is likely to be a gap between the requirements of new firms (in terms of suppliers and customers) and their direct (institutional) environment (Boschma and Frenken, 2006). Therefore, many locations are initially capable of becoming agglomerations during the start-up phase of a new industry, but only some will actually successfully do so. As the industry matures over time, these windows close again. The initial neutral space in which the new industry emerged evolves path dependently into a real place consisting of spatially concentrated clusters of specialized and related industries. Institutional adaptations are made in order to accommodate the requirements of the new industry. Not every region will be capable of accommodating new industries because of technological and institutional lock-in (Boschma and Lambooy, 1999).[1]

Such an understanding of windows of locational opportunity is, however, not without shortcomings. These shortcomings have to do with the lack of empirical

[1] Evolutionary economic geography does, however, explicitly recognize that through technological relatedness and historically developed skills and craftsmanship some old industrial regions are able to upgrade and develop more high-tech activity. Likewise, the concept of windows of locational opportunity has also been used in understanding the process of regional economic revitalization.

applications and, more conceptually, the exclusion of power relationships in either shaping or constraining windows of locational opportunity (Mackinnon et al, 2009). The lack of empirical elaboration obscures how strategic actions of different types of actors (territorially embedded and nonembedded) shape or constrain the opening of windows of locational opportunity for investment within certain economic sectors or within certain regions. Related to this issue is the conceptual neglect of power relationships. We have no reason to believe that actors in the process of opening or constraining windows of opportunity do not hold different degrees of power. Some actors will use their power, including mobilizing institutional resources or alternative discourses, in order to constrain or enable the particular window of locational opportunity. This issue becomes more acute when different locations are competing for similar investment opportunities and where different actors can have different stakes in certain locations. Indeed, windows of locational opportunity should be viewed in a competitive perspective.

We think that these problems result exactly because the concept of windows of locational opportunity has primarily been applied to the emergence of new industrial regions. Typical of new industries is that corresponding institutional arrangements have not yet been well articulated, nor have their interests become firmly territorially embedded. These issues are more prominent in mature industries. Within a mature industry (such as the port and transport industry), the drivers for opening and creating windows of locational opportunity do not develop independently of established spatial structures, nor do they emerge within a neutral space. On the contrary, typical of mature industries is that material and societal interests have become much more articulated in certain competitive locations and within corresponding institutional frameworks. Technology has in most cases been standardized, with competitive advantage largely being driven by economies of scale. Competition and other market-based selection mechanisms provide pressure for change, but they unfold within existing (spatial) structures of power and communities of practice.

What is needed, therefore, is a perspective in which the process of shaping and constraining windows of opportunity is viewed in relational terms. A relational perspective implies a focus on the interactions among actors, most notably firms, through a geographical lens, and how such interactions lead to a process of learning, innovation, and organizational and institutional adaptation (Bathelt and Gluckler, 2003; Yeung, 2005). In this perspective, regional development should be understood as the outcome of interactions between different actors. These interactions and relational ties are not confined to territorially bounded entities, nor are they limited to the local scale. On the contrary, they extend beyond the region through corporate and social networks as they are articulated across different spatial levels or scales (Dicken et al, 2001). Power is only one among many relationships that shape regional development outcomes, but it becomes more relevant in mature industries in which interests have become much more territorially vested and institutionally articulated. Therefore a relational approach requires a "sensitivity to questions of power and interest, recognizing that such strategies are often formulated by dominant and hegemonic groups" (Mackinnon et al, 2009, page 137). More specifically, this implies a relational perspective of power, politics, and collective action, whereby power is viewed in relational terms as 'the capacity to exercise that is realized only through the process of exercising' [Allen (2004); see also Dicken et al (2001) and Yeung (2005) and for the specific case of seaports Jacobs and Hall (2007)]. Such a perspective will allow us to analyze how, through strategic or collective action, windows of opportunity occur at different locations in a region but under similar competitive pressures for investment by a certain industry.

The way forward we propose is by making use of the work of Buitelaar et al (2007) on windows of opportunity. We continue by first sketching major developments in the maritime and port industry. After this general introduction to the industry, we discuss the model of Buitelaar et al and extend its application in order to analyze the regional evolution of seaport systems.

3 Integration and regionalization as drivers of port development

The market environment in which container ports and shipping lines operate is changing radically. The developments in supply chains and logistics models urge market players to revise their function in the logistics process (Notteboom and Winkelmans, 2001; Robinson, 2002). Magala and Sammons (2008) argue that port choice should be considered a by-product of a choice of logistics pathway. A growing understanding of the strategic role of ports in global logistics networks has made supply-chain managers base their port-choice decisions increasingly on reliability and capacity considerations, next to pure cost considerations (ESPO/ITMMA, 2008). In response to the mounting challenges, the last decennia have seen a massive horizontal and vertical integration in the maritime and logistics industry. Horizontal integration through market consolidation has resulted in large port clients who possess strong bargaining power vis-à-vis terminal operations and inland transport operations. Loyalty to the home port tends to fade as large players are expanding their reach over more than one port. The market environment has brought new kinds of interfirm partnerships at the port-terminal level, involving ocean carriers and global terminal operators who try to hedge the risks associated with the container business (see Notteboom, 2002; Olivier, 2005; Olivier et al, 2007; Slack and Frémont, 2005; Soppé et al, 2009). Song (2003) argues that the changing business environment calls for new ways of cooperation among ports in an effort to establish a countervailing power, a trend tagged as 'co-opetition'. Port operators adopt a strategic approach of co-opetition (Noorda, 1993), mixing competition and cooperation. Notteboom and Rodrigue (2005) introduced a regionalization phase in port and port-system development to capture ports' responses to the changing market environment. The model extends the earlier spatial models of Taafe et al (1963), Hayuth (1981), and Barke (1986). The port-regionalization phase is characterized by a strong functional interdependency, and even joint development of a specific load centre and (selected) multimodal logistics platforms in its hinterland, ultimately leading to the formation of a regional load-centre network. The transition towards the port-regionalization phase is a gradual and market-driven process which mirrors the increased focus of market players on logistics integration (Notteboom and Rodrigue, 2005).

Although the model draws implications for port governance and recognizes potential constraining institutional factors in the evolution of regional integrated port systems, it undertheorizes the role both of strategic agency and of institutional structure. It remains unclear exactly how territorially endorsed institutional legacies constrain (or enable) regional integration, and how this in turn shapes actors' expectations and strategic actions. In addition, it remains unclear under what conditions and by what actions actors actually succeed in formalizing regional integration. This becomes critical when ports are located in close spatial proximity to each other, but within two different (nation-)state or port-authority jurisdictions.

But the private sector will also have its reservations: vested interests, contractual agreements, and existing investments in what are essentially competing locations may result in strong place-bound commitments. Such private commitments can result in territorial (multiscalar) coalitions, or other forms of collective action, between powerful special-interests organizations (Boschma and Frenken, 2009) and state agencies, which

can act as countervailing forces against formalized regional integration. Indeed, as Hall and Jacobs (2010, page 1113) put it when referring to port regionalization, "There is every reason to expect resistance to changing such institutional arrangements that are a reflection of deeply held constitutional systems and established national interests, and that were not established with the contemporary [regional] port system in mind."

4 The evolution of regional port systems

4.1 Revisiting a model of institutional change

In shaping an evolutionary perspective on the development of regional port systems we extend the work of Buitelaar et al (2007). In line with Kingdon's (1995) model of policy agenda setting and windows of opportunity, Buitelaar et al developed a theory of institutional change which, they argue, is a combination of evolution and deliberate design (figure 1). A first window of opportunity for change emerges when external (societal and market) developments are considered to be incompatible with the existing institutional arrangement (supported by a hegemonic discourse). The institutional reflections by the actors involved (referred to as 'bricoleurs') generate ideas and solutions for the economic dysfunctional or societally incompatible institutional arrangement in what can be referred to as 'institutional design'. When the existing institutional arrangement is successfully challenged, a *critical moment* for change will occur (1st window of opportunity, critical moment, in figure 1).

However, this does still not imply that institutional transformation will be effected. At the critical moment, opponents of change will come up with alternative

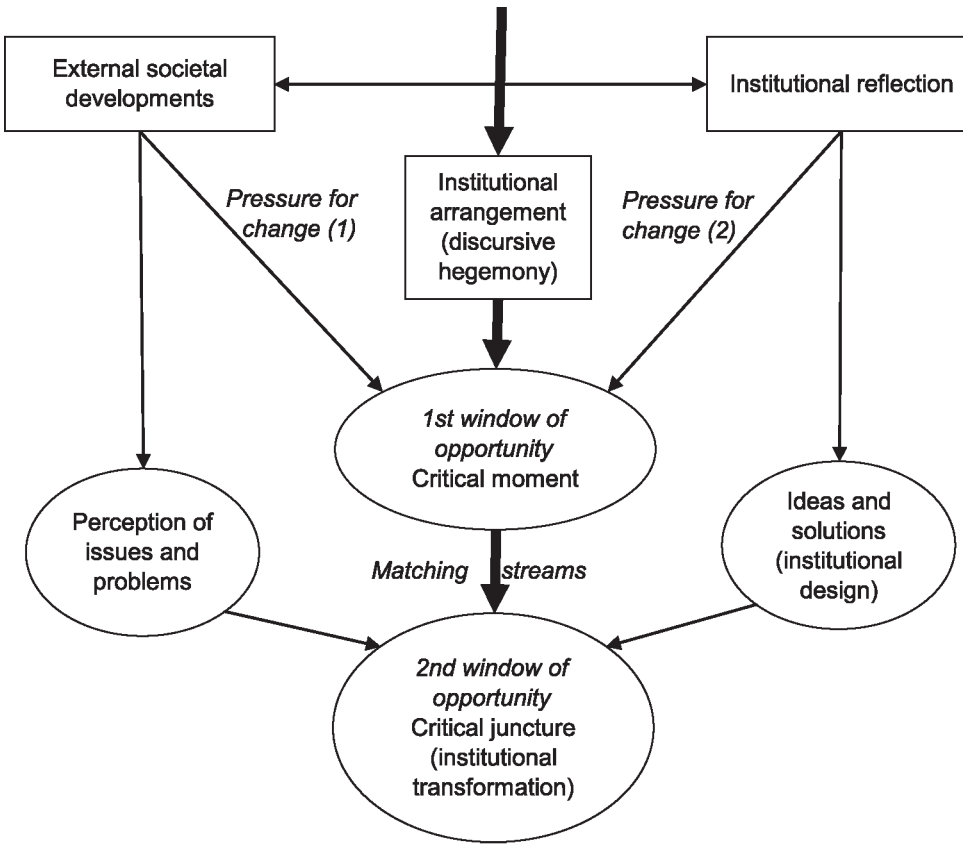


Figure 1. A model of institutional change (Buitelaar et al, 2007, page 897).

ideas and solutions. Therefore, in order for institutional transformation to be effected, a second window of opportunity needs to be opened: the *critical juncture* (figure 1). This critical juncture emerges when, analogous with Kingdon's three matching streams,[2] external developments have been translated into perceived problems which are matched by solutions and an appropriate institutional design which, most crucially, are politically and institutionally supported and endorsed. Once these three streams are matched, institutional transformation will occur. In most cases, the institutional transformation will be incremental: The creation of an entirely new path of development is quite rare. Institutional dynamics therefore inhibit degrees of 'plasticity' (Strambach, 2010) which refers to the continuity of change without necessarily breaking out of existing paths. This is due to the fact that possible solutions and alternative designs put forward are in most cases confined to existing dominant interests and constrained by investments made in the past. As such, this conceptual model provides "a better understanding of how actions aiming at institutional design are positioned within a perspective of institutional evolution" (Buitelaar et al, 2007, page 897).

Buitelaar et al (2007) correctly note that the model is somewhat stylized and that the empirical reality is much more messy than the model suggests. It should therefore be read as an analytical model. Nonetheless, although we agree with the analytical value of this model, we see possibilities for further sophistication and extension of its applications. We do not think that this model is limited to institutional transformation per se. Within this model, the concepts of institutional arrangements and design can be easily replaced by organizational routines and organizational forms (Boschma and Frenken, 2006). This corresponds with the perspective in which institutions are viewed as both internal (routines) and external (rules of the game) to the firm as a unit of analysis in evolutionary economic geography.[3] Firms, for example, operate within a dynamic environment in which they constantly monitor their competitors' moves, market opportunities, and sociopolitical developments (such as demographic change or new legislation) in close coordination with the firm's performance. Changes within that environment—for example, a new technology, new legislation, or the removal of barriers to trade—can generate pressure for change in the organizational forms and/or routines. Organizational reflection can come internally from, for example, the shareholders or the R&D department, or externally, from consultants or the labour unions. This might result in critical juncture internal to the firm where the firm adopts a new business or governance model (eg outsourcing) or a new technology (eg ICT) which, in turn, changes the organizational form and/or routines.

Such transformation or evolution is most definitely not without conflicts of power and capitalist antagonisms. Labour often conflicts with firms' management decisions to replace labour by new technology and machinery—a reoccurring event at the waterfront, where union interests have been particularly well articulated (Turnbull, 2006). Likewise, multinational terminal operators are capable of transferring their successful routines to different ports in different countries but, at the same time, ports resemble 'local communities of practice' which are firmly rooted in robust territorial structures

[2] In his model of policy agenda setting, Kingdon (1995) distinguishes three streams which, once they are matched, create a window of opportunity. These matching streams are (a) societal issues that are conceived as problematic, (b) policy solutions at hand, and (c) political endorsement and action.

[3] Organizational routines and external rules of the game should, however, not be merged. They remain analytically distinct and possess their own evolutionary characteristics, even though to some extent they influence each other. However, the model of Buitelaar et al is fit to analyze both institutional reflection and change as well as organizational learning and adaptation.

of power and corresponding institutional realities (Hall, 2003; Hall and Jacobs, 2010; Jacobs, 2007).

A second issue is that the model confines itself to institutional arrangements at a particular time and place and, in so doing, considers the process of institutional transformation within a territorially confined context and in relative isolation. Although it recognizes 'external societal developments' as a pressure for change, the processes of reflection and change are restricted, occurring within certain jurisdictional boundaries and a particular society. This is problematic in a competitive and interconnected world, where external pressures for change occur simultaneously at different locations—albeit under different institutional conditions. Stakeholders can have strategic interests at multiple locations and at different scales linked through networks (corporate and social) and institutionally articulated (multilevel) governance arrangements of the state. Moreover, we argue that part of the external pressures that lead to a window of opportunity at a certain location might also be a critical moment at another, competitive, location. In this process some actors hold different degrees of power and are better able to mobilize (institutional) resources than others. We therefore need to extend the model of Buitelaar et al by adding a relational perspective that will allow for the analysis of the opening and closure of windows of opportunity at different locations in relation to each other. We do this by applying the model in a seaport context.

4.2 Extension of the model in a seaport context

Although the port and maritime industry is not a new industry, vertical and horizontal integration has clearly changed the competitive setting in the industry (Notteboom and Winkelmans, 2001), so that firms can have direct intraorganizational stakes in several spatially proximate locations, leading to new interdependencies between ports (Hall and Jacobs, 2010). The emergence of network structures alongside shipping lines and terminal operators allows more routing alternatives to be offered to the customer base, thereby taking advantage of the cargo-control characteristics of the load centres involved. These network structures enhance competition among the ports considered. Shipping lines do not put all their eggs in the same basket, so a 'multiport gateway region' (see Notteboom, 2010) can offer an opportunity for a port operator to enter a regional market by using a new terminal or port outside the stronghold of a competitor. These competitive dynamics support new port hierarchies and a multiplication of the number of ports engaged in containerization. In addition, firms and port authorities have developed new routines in correspondence with each other. Carriers and shipping lines started to demand dedicated container-handling space, which grants them privileged use of the limited berths available and, as such, allows them to reduce operational uncertainty in servicing the gateway region and its hinterland. Responding to these demands, port authorities started to offer dedicated terminal lease concession agreements to their global operating clients (Notteboom, 2007). These agreements allowed them to secure cargo volumes and tariff income for the port while avoiding the risk of being bypassed altogether. Thus, as containerization (as a form of technology standardization) and corresponding industry conventions governing the use of limited terminal space (understood as organizational routines) became widely dispersed, competition between port locations in gateway regions intensified in the period of traffic growth prior to the 2008–09 global economic crisis. In this overall period of growth, new windows of opportunity emerge for secondary ports and for market players to enter the lucrative regional container market and to challenge the regional status quo. This makes the application of the concept of windows of locational opportunity very relevant in the more mature port and maritime industry.

Our model extends that of Buitelaar et al (2007) in the following manner. We argue that for locations specialized in certain economic activities, and within close proximity to each other, a *pattern of regional evolution emerges*. The emerging pattern is a series of windows of locational opportunities for similar investment possibilities in the region, resulting from strategic action both of market players and of local authorities. This evolution is the result of competition between firms in which specialized locations compete for similar investment opportunities, and in which each location closely monitors the others' strategies. Outcomes in one port location shape the opportunities for development in another, leading to a certain path of regional development—as explained below.

The line of reasoning we propose is as follows. A certain firm decides to invest in a region. At a certain location there is a window of opportunity for (port) development, resulting in a critical moment. However, these developments are critically scanned by the location's nearby competitor which, in turn, starts to react strategically, which might result in a window of opportunity at that location as well. An example of this situation has been given by Hall (2003) in an analysis of the development of the port of Baltimore. Maersk was reconsidering its location in the port of New York as its principal load centre for the US East Coast. This created a critical moment for the agents acting on behalf of the port of Baltimore to lure Maersk and its containerized traffic to its port. However, in response to Maersk's potential departure, the port of New York agreed upon dredging concessions in order to fulfil Maersk's conditions for an extension of their operations on the Hudson. In conceptual terms, this means that in New York a critical juncture emerged whereas in Baltimore it did not: that is, the window closed again. From a terminal-operative perspective, the interdependence between the various ports is not always of a competitive nature. Co-opetition at terminal level can emerge when a global terminal operator gains access to the operation of terminals in more than one port of the multiport gateway region.

Figure 2 provides a schematic representation of our extended version of the model of Buitelaar et al (2007). The simplified model assumes two competing firms and two competing locations for terminal development in the same gateway region. Both of the firms will face specific external market and societal developments. At a certain period in time (t_1) the existing port hierarchy in the port region is challenged by a first window of opportunity for firm 1 in port location A. This window of opportunity is created under pressure of both external market developments and the market reflection of firm 1, and generates a first critical moment. If port location A gives a positive reply to the pressure then two actions can occur:

(a) competitive action might be triggered via a market reflection of firm 2 to develop a terminal in competing location B;

(b) port location B tries to counter the terminal plans in port location A by making a strong offer to lure firm 1 away from its plans to develop activities at location A. This can result in a bidding war between the two port locations, in which a critical junction in port location B denies the same in location A.

In both cases, the result is the opening of a window of opportunity in port location B at time t_2. The interaction between firms 1 and 2 and locations A and B triggers a process of action and reaction spread out in time, and eventually resulting in a second window of opportunity at time t_3. This transformation could involve a wide range of possible outcomes: (a) no terminal developments at all; (b) terminal development at location A and operated by firm 1; (c) terminal developments at both locations, with each location having a different operating firm; (d) terminal development at location A and operated by firm 2; (e) terminal development at location B and operated by firm 1. The outcome will be determined by the

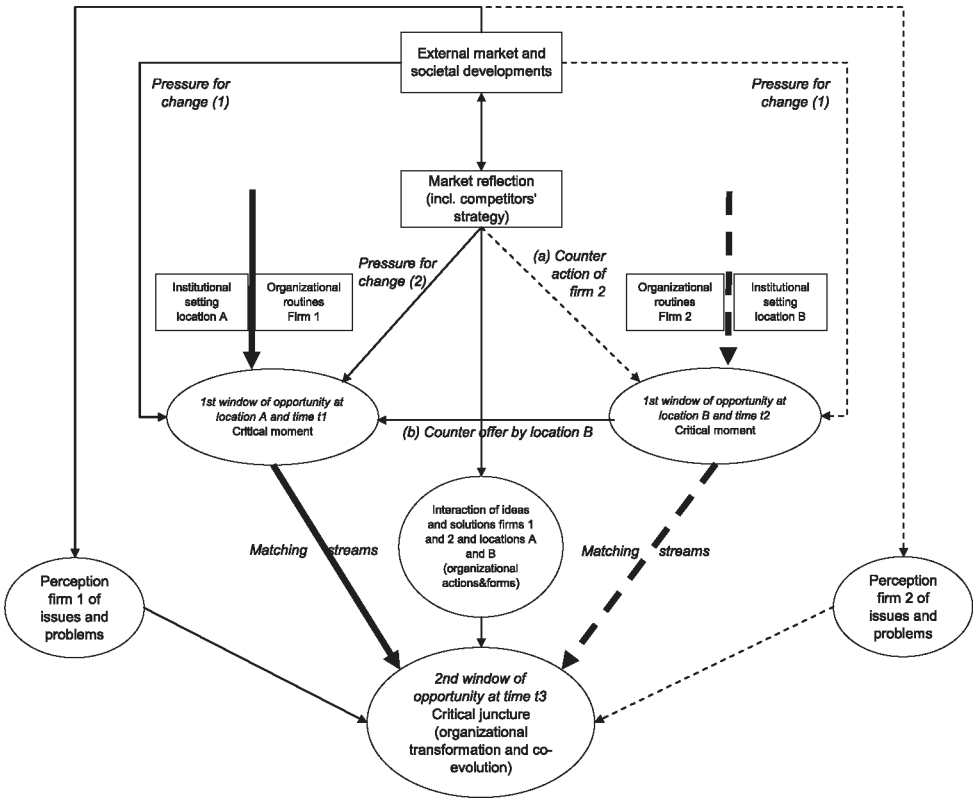


Figure 2. A model of the regional evolution of port development.

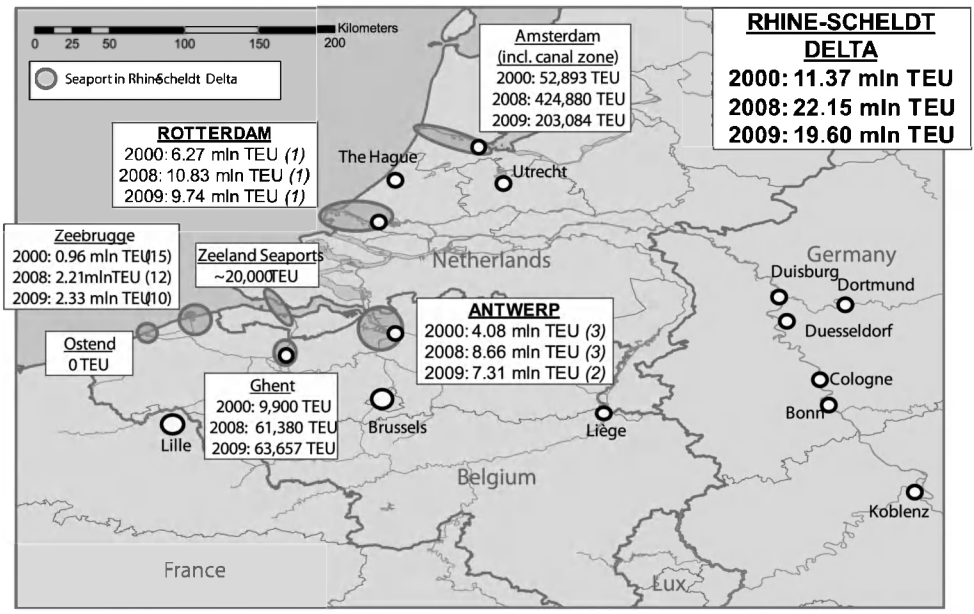
interaction between perceptions, reflections, and critical moments and the way this interaction culminates in the critical juncture. A critical moment does not necessarily refer to a specific instant in time, but can involve a longer period of time: for instance, in the case of concession procedures which can easily last up to a year—from the opening of the procedure to possible candidates up to the granting of the terminal (the critical juncture). A critical juncture serves as the end point or closing of a (set of) critical moments.

The regional evolution of ports is thus driven by a set of complex interactions which could lead to a multitude of possible outcomes. This observation is in line with the findings of Notteboom (2009a, page 72), who stated that "a certain degree of path dependency in the development of ports at a regional scale exists, but the sequence of events makes a difference for the outcome. Port development processes also show a certain degree of contingency. Strategies and actions of market players and other stakeholders may deviate from existing development paths."

5 Application to container terminal development in the Rhine – Scheldt Delta

5.1 Profile of the Rhine – Scheldt Delta

In the remainder of this paper we apply the conceptual model to a number of terminal-development cases in the port system of the Rhine – Scheldt Delta—the fourth largest container gateway region in the world, and the most important gateway region in Europe (Notteboom, 2009b). The delta features a high concentration of seaports, with a joint container throughput of 22.2 million TEU (twenty-foot equivalent) in 2008 (about 23% of the European total) and 19.6 million TEU in crisis year 2009



Note: Seeland Seaports comprises the ports of Flushing and Terneuzen

Figure 3. [In colour in the online version.] Container throughput in the gateway ports of the Rhine–Scheldt Delta in 2000, 2008, and crisis year 2009 (ranking among European container ports in parentheses).

(see figure 3). Only Rotterdam, Antwerp, Zeebrugge, and more recently also Amsterdam (with mixed success), are involved in large-scale container terminal operations. The port of Flushing, managed by the port authority Zeeland Seaports, is striving to join the list of large-scale container load centres in the region.

The Rhine–Scheldt Delta is an interesting gateway region for illustrating the conceptual model. First, the region features a mix of large established ports (Rotterdam and Antwerp, the largest and second largest container ports in Europe respectively, and a range of medium-sized and small load centres which, to a greater or lesser extent, challenge the position of the large load centres. This makes the evolutionary approach in terms of windows of opportunity particularly interesting. Second, the region is home to a large number of global terminal operators, and all leading shipping lines have calls in one or more ports. These market players (which can have stakes in various ports in the region) have strong bargaining power vis-à-vis local authorities in terms of investment conditions and lease concessions. Third, Notteboom (2009b) demonstrated that the relationships between the ports are not only of a competitive or substitutive nature. A level of port complementarity exists, emanating from terminal ownership structures, the ports' cargo orientation in the foreland and the hinterland, and the locational and logistics qualities of the respective seaports. Fourth, the ports in the Rhine–Scheldt Delta region are embedded within different local governance structures and national institutional frameworks, resembling vested interests which remain resilient to formalized regional integration. As such, the Rhine–Scheldt Delta region is a good focus for illustrating the roles of strategic action, power conflicts, and territorial institutions in shaping or constraining windows of opportunity.

The existing large load centres are developing new terminals to meet future demand for container-handling capacity. The port of Rotterdam is constructing a second Maasvlakte on land reclaimed from the sea, of which a large part will be

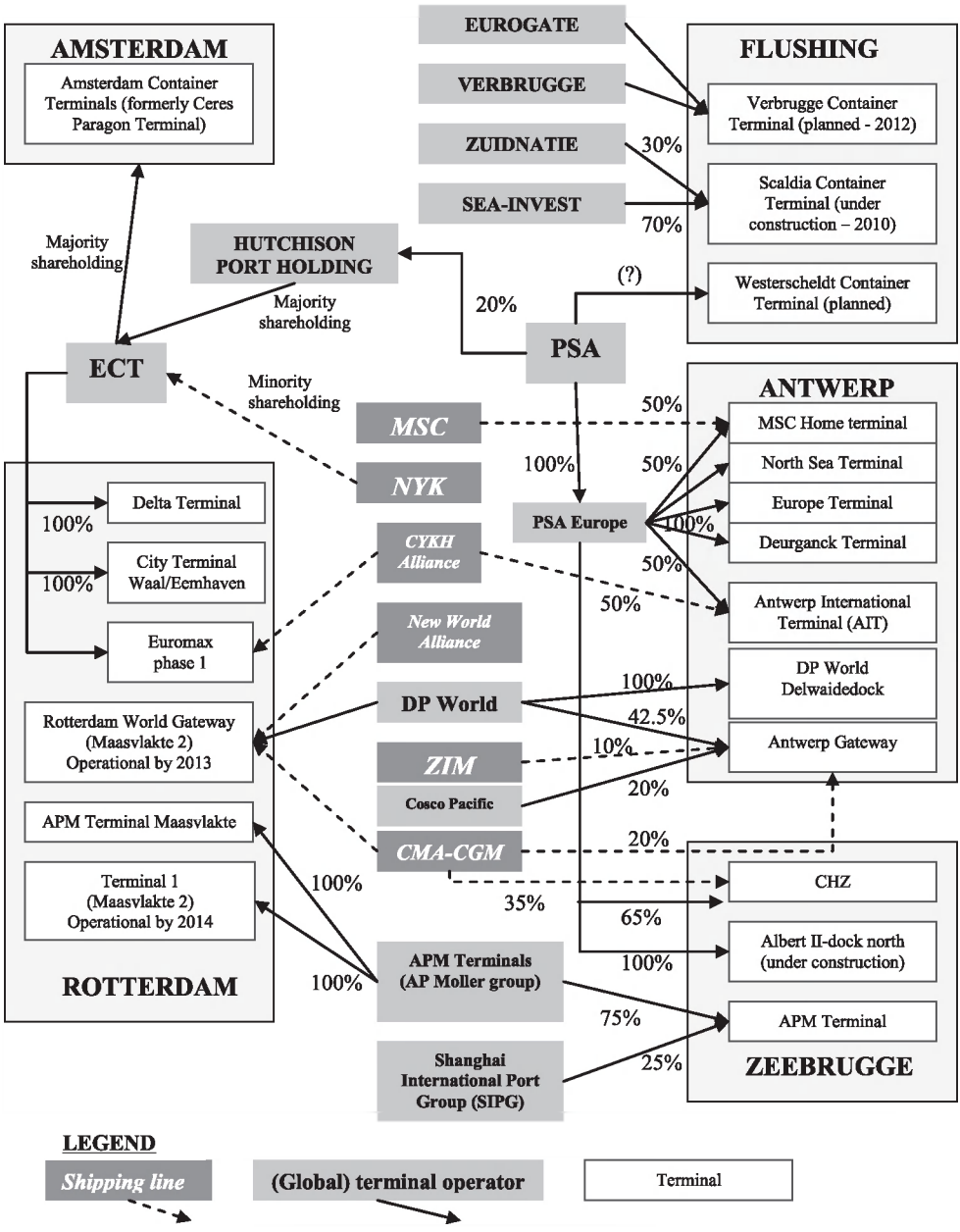
dedicated to the container business; the first terminal should be open for business by 2013 – 14. The new Euromax terminal (to the north of the current Maasvlakte) started operations in 2008. Antwerp opened the first phase of a tidal container dock on the left bank of the River Scheldt in 2005. When fully operational, this Deurganck dock will reach an annual capacity of at least 8 million TEU. Antwerp has plans for the development of a second large tidal dock on the left bank: this Saefthinge Dock could very well double the port's current container capacity. Medium-sized coastal ports and new hub terminals in the Rhine – Scheldt Delta hope to successfully challenge the position of the large load centres. Zeebrugge and Amsterdam are already vying for deepsea container flows. Zeebrugge has recently moved into the top ten largest European container ports and is still a long way from operating at anything like full capacity. Several container-terminal initiatives in Zeebrugge, Amsterdam, and Flushing aim to multiply the routing options available to cargo moving through the Rhine – Scheldt Delta. In conceptual terms, these initiatives imply that a number of windows of locational opportunity have been triggered in the region to capture parts of the growing containerized traffic. These windows opened because of market demands for extra berthing space in the region, anticipated by local authorities who saw opportunities for job creation and economic growth.

Notteboom (2009b) found that, ten years ago, local terminal operators dominated the container-handling scene. At present, the container-terminal business in the Delta is dominated by four global terminal operators (Singapore-based PSA, Dubai-based DP World, APM Terminals of the AP Möller group, and Hutchison Port Holding of Hong Kong), and a handful of shipping lines which have minority shareholdings or are engaged in joint-venture arrangements (eg CMA – CGM and MSC, to name but two). Figure 4 depicts the complex terminal ownership structure in the Rhine – Scheldt Delta. A number of global terminal operators and shipping lines have interests in more than one terminal in the Delta, often even in different ports, leading to a certain degree of co-opetition in the region.

In the remainder of this section we discuss three concrete cases of firm interrelationships and windows of opportunity shaping terminal development and port competition in the region. Two of the cases concern the search of terminal operating companies (Seaport Terminals and APM Terminals) for container-terminal capacity in the delta. The third case analyzes the strategy of a port authority (Zeeland Seaports) to enter the highly competitive container scene. The three cases reveal how windows of locational opportunity in the region open and close in relation with each other: a critical moment at one port location triggers a response at another port location. In the process, competing terminal operators seek alignment with local authorities—either to defend their market position or to gain access to the regional market; the use of terminal concession procedures acts as the most important tool for port authorities to grant market access to terminal operators. The regional path of development of port systems thus results from interrelated and iterative processes of individual terminal operators succeeding or failing to win the bid for a terminal concession.

5.2 Case study 1: the rise and fall of container activities at Seaport Terminals

In the late 1980s Seaport Terminals was one of the main container-terminal operators in Antwerp. Seaport Terminals wanted to secure its future development potential by obtaining the concession of one of the two new Scheldt terminals in Antwerp. However, the Europe Terminal (opened in 1990) was granted to Hessenatie in 1987 and the North Sea Terminal (opened in 1997) to Noordnatie. Thus, two consecutive windows of opportunity to expand the firm's position in the container-terminal industry in



Notes: [a] NYK is part of the Grand Alliance which includes the shipping lines Hapag-Lloyd, NYK, and OOCL. The Malaysian shipping company MISC was a member of the Grand Alliance until early 2009. [b] The CKYH Alliance includes the shipping lines Cosco, K-Line, Hanjin, and Yang Ming. [c] The New World Alliance includes the shipping lines APL, MOL, and Hyundai Merchant Marine.

Figure 4. The complex interfirm relationships in terminal operations in the Rhine–Scheldt Delta—situation in the summer of 2010.

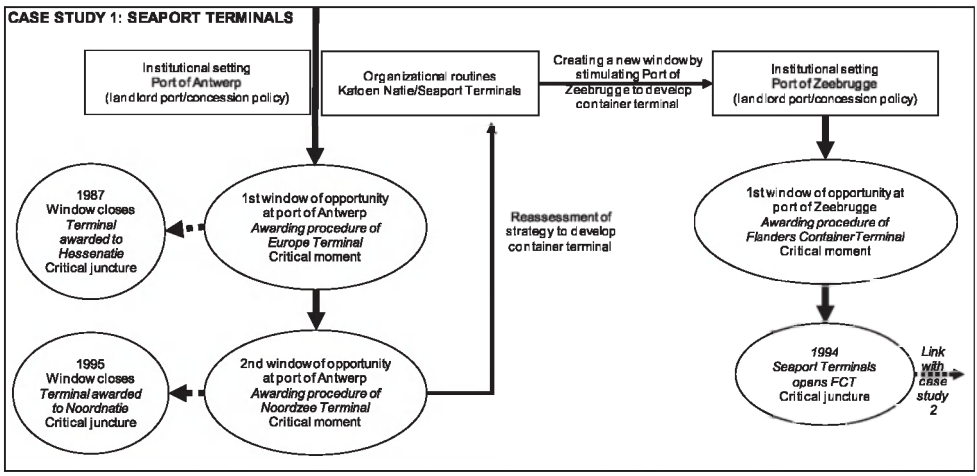


Figure 5. Windows of opportunity between the ports of Antwerp and Zeebrugge driven by organizational routines of Katoen Natie/Seaport Terminals and the institutional setting/concession policy of the respective port authorities.

Antwerp closed (figure 5). After a series of unsuccessful legal actions against the Antwerp Port Authority concerning the transparency and fairness of the concession procedures, Seaport Terminals moved its attention to the coastal port of Zeebrugge in the 1990s. Via its interaction with the local port authority MBZ, Seaport Terminals was able to open a window of opportunity in Zeebrugge. Mother company Katoen Natie eventually obtained a concession to operate the new Flanders Container Terminal (FCT) in Zeebrugge (critical junction). However, Katoen Natie/Seaport Terminals never succeeded in reaching a reasonable utilization rate at FCT. Katoen Natie eventually pulled out of container-terminal activities in Zeebrugge. The Antwerp container activities of Seaport Terminals were sold to P&O Ports in 2000.

5.3 Case study 2: the expansion strategy of Maersk/APM Terminals

In the early 2000s APM Terminals (APMT) faced growing capacity constraints in Rotterdam. The existing facility was fast reaching full capacity, and the new 4.5 million TEU terminal at Maasvlakte 2 will not be available until 2014. Maersk made an attempt to enter the Antwerp container business as a candidate for one of the phases of the Deurganckdock, but this window of opportunity closed (figure 6). The eventual winners were PSA (west side of the dock) and the Antwerp Gateway consortium (east side). APM was more successful in Zeebrugge. In October 2004 MBZ announced that APMT had been named the preferred bidder for the concession to manage and operate the former FCT. The terminal, with a design capacity of 2 million TEU, resumed operations in 2006 and gives Maersk Line some room for growth in the Rhine–Scheldt Delta. In mid 2010, the Shanghai International Port Group (SIPG) acquired a 25% shareholding in the Zeebrugge facility. The involvement of the SIPG should be seen in connection to the deal which APMT made with the port of Shanghai on the exploitation of a large container facility at the new Yanshan port in the outer Hangzhou bay. In December 2005 APMT and SIPG signed a joint-venture contract together with Hutchison Port Holdings, Cosco Pacific, and China Shipping Group to operate the second phase of Yangshan port. The links between APMT and SIPG demonstrate that the evolution of port systems in terms of windows of opportunity is not necessarily restricted to the local/regional scale, but can have a global dimension.

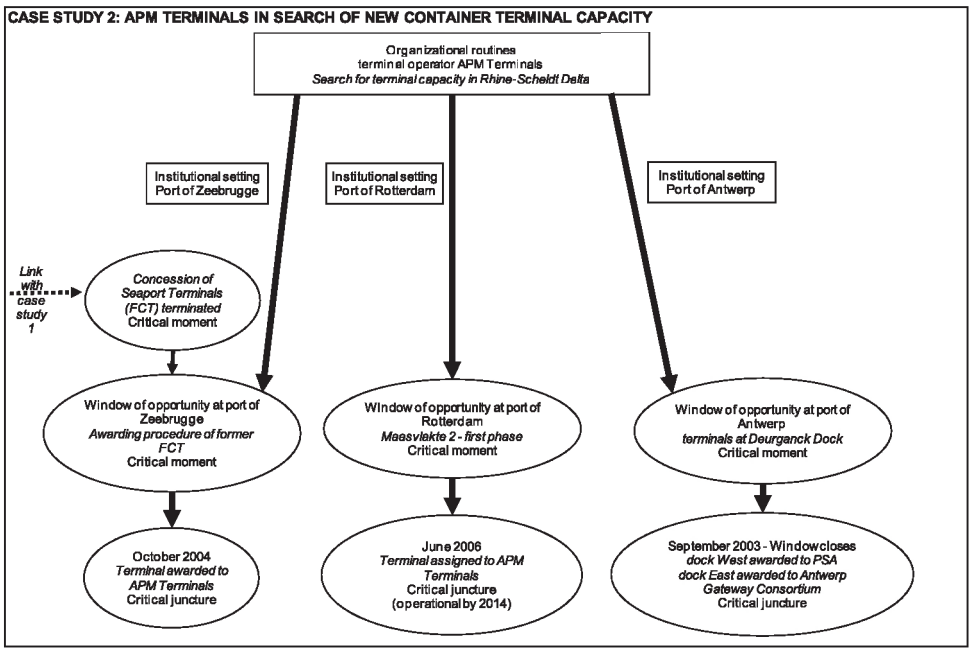


Figure 6. Windows of opportunity between the ports of Antwerp, Rotterdam, and Zeebrugge driven by the search of APM Terminals for new container-terminal capacity in the Rhine–Scheldt Delta and the institutional setting of the respective port authorities.

5.4 Case study 3: Flushing's plans to enter the container scene

In the late 1990s the port authority of Flushing (later merged with the port of Terneuzen, to become Zeeland Seaports) developed its first ideas to enter the container scene (figure 7). The port of Flushing and the Port of Rotterdam jointly set up an economic cooperation agreement (ESM) in the same period to develop the Scaldia port (an area in the inner port of Flushing). This move represented a new institutional setting for the port of Flushing. The ESM actively participated in realizing Flushing's ambitions to have a large-scale container facility at its disposal. Although the Rotterdam Port Authority never made official statements on the reasons behind the cooperation with Flushing, it was quite clear that the port of Flushing could serve as a strategic reserve for Rotterdam in case the Maasvlakte II project were to be jeopardized at some point.

The first concrete plans to develop a large-scale terminal in Flushing date back to 2002–03. The idea at that time was to develop a Westerscheldt Container Terminal (WCT) at the mouth of the river Scheldt, outside the existing dock system. The initial design encompassed a quay length of about 2.4 km. However, due to environmental objections, mainly linked to the existence of a fossil beach at the terminal site, the port authority had to downsize the terminal design to 2 km quay length. Right from the start, Singapore-based PSA was actively involved in the design of and support for the terminal initiative. Many saw the involvement of PSA as a defensive move, to make sure that no competitor would take control of a terminal that is located at the front door of its large facilities in Antwerp about 80 km upstream from Flushing.

The decision process relating to the development of WCT has still not been completed, despite approximately eight years of study work. The lengthy process has had two important side effects, which could jeopardize the whole project.

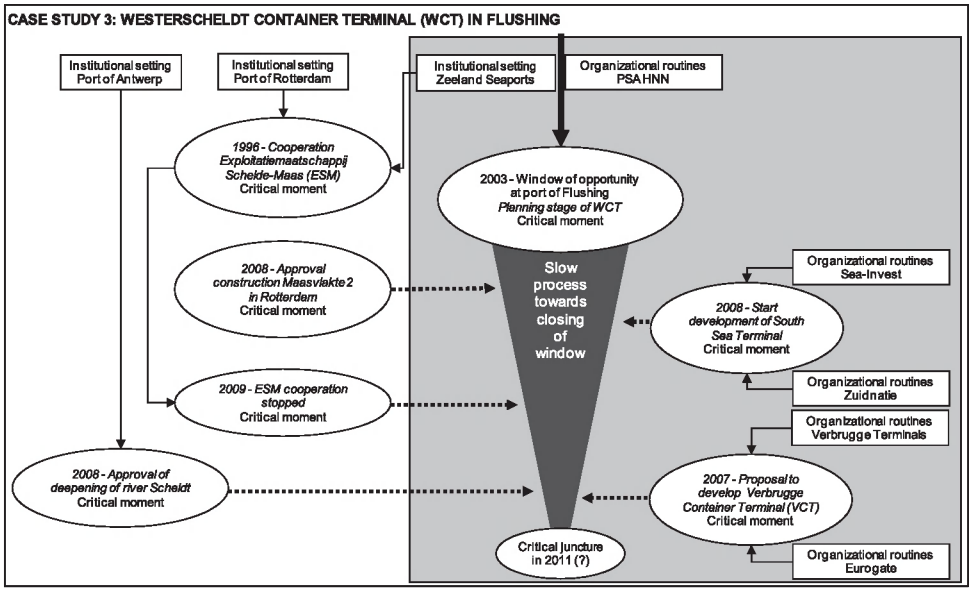


Figure 7. Windows of opportunity in terms of the plans of the port of Flushing (Zeeland Seaports) to enter the deepsea container terminal market via the Westerscheldt Container Terminal.

First, when the WCT initiative was first introduced there was still a considerable amount of uncertainty concerning whether the large ports of Antwerp and Rotterdam would be able to secure a further growth of container capacity in the port.

- In 2003 the construction works at the new Deurganckdock in Antwerp were halted for almost a year due to legal action on the part of a community group from a nearby village. This temporarily led to nervous reactions and a growing uncertainty in shipping and terminal operator circles.
- The much-needed dredging programme for the river Scheldt, the artery to the Antwerp port, still needed approval. The whole decision on the deepening of the river was made subject to a broad debate on the economic, natural, and environmental function of the Scheldt estuary. The final approval to start deepening the river was granted in 2008, and thereby ended a period of uncertainty for shipping lines which wanted to deploy larger vessels to call at Antwerp.
- Mainly environmental issues resulted in a very lengthy decision process regarding Maasvlakte II in Rotterdam. Even up to the year 2008 legal actions and objections from a number of stakeholders continued to undermine the port authority's expansion plans. Construction at the breakwater eventually started in late 2008, while in the past few years several terminal operator groups were granted a concession at Maasvlakte II. This set of critical junctions ended a long period of anxiety about the realization of this project which is very strategic to Rotterdam's future.

In summary, the uncertainty surrounding the realization of a number of strategic projects in Antwerp and Rotterdam opened a window of opportunity for Flushing to successfully enter the container market. Recently, all these strategic projects have been approved. At present the window of opportunity for Flushing might not be entirely closed, but the room to manoeuvre has certainly become much smaller.

Second, the long discussion on the feasibility and desirability of WCT created an atmosphere in the market where the discussion shifted from the question of whether Flushing needs a large-scale container terminal to the question of whether WCT is the

best alternative for developing large-scale container facilities in Flushing. This shift in the debate opened a window of opportunity for incumbent firms in the port and also attracted newcomers. In 2007 the incumbent terminal operator Verbrugge announced that it sought to refurbish its large multifunctional terminal in the inner port and to convert it into a container terminal with a capacity of 2.5 million TEU (compared with 2.2 for WCT). This action created a shockwave among the defenders of the WCT, as Verbrugge did not coordinate its announcement with the port authority. In addition, Verbrugge later announced that they would team up with the German–Italian leading terminal operator Eurogate. Obviously, Eurogate saw the plans for Verbrugge as a window of opportunity to enter the Rhine–Scheldt Delta after years of unsuccessful bids in the other ports of the Delta. At present, three initiatives are developing to start deepsea container terminal handling: the Westerschelde Container Terminal, the Verbrugge Container Terminal, and the South Sea Terminal (SST). Sea Invest/Zuidnatie is planning to start the SST in 2011. The other terminals are still in the planning phase. A new critical junction is near.

6 Conclusions

This paper is a response to recent debates within economic geography about conceptually integrating institutional and evolutionary approaches, and applying these recent insights to study port development. This paper has focused on the role of territorial institutions and strategic action in opening windows of opportunity at different competing locations for investment and growth within a certain economic sector. Such a relational approach is particularly relevant in a sector dominated by international firms which have strategic stakes in several locations in a region, but where alternative locations seek to enter the regional market—often in alignment with competitor firms and local authorities. In such a situation we can expect a process of regional evolution to take place, whereby a window of opportunity at one location triggers a response at another location.

The three illustrative case studies demonstrate that the competitive development in the multiport gateway region of the Rhine–Scheldt Delta is highly dependent on a complex of failed and successful bids for terminal concessions, as part of the institutional setting at these locations, in combination with a set of merger and acquisition moves in the terminal-operations industry and liner shipping, as part of firms' routines. The outcome of each event has had an impact on the possible outcomes in the next step of the development of the regional port system. The combination of (missed) windows of opportunity and critical junctures has created a distinctive path of development among ports in the Rhine–Scheldt Delta. Nevertheless, the locational windows of opportunity are constrained. There are only a few sites available for major port development in the region and the role of institutional players is mainly visible when concessions are awarded. Thus, the balance between institutional arrangements and organizational routines in explaining port development in terms of windows of opportunity shifts over time. The role of institutions and strategic action is very important during concession procedures but, once a terminal has been awarded, the path of development is shaped mainly by commercial forces and organisational routines.

How to proceed with the development and application of this framework? The case studies introduce two points for further theoretical development. First, there is the issue of time in the emergence of windows of opportunity and related critical moments and critical junctures. Although the terminology used here suggests that there are particular moments in time, in reality these 'critical moments' are temporal trajectories which can easily last for up to a year. The critical junctures, on the other hand, are

more defined in time. Second, more theoretical scrutiny is needed to specify further the interrelationships between business opportunities (critical moments) and institutional requirements (critical junctures). In our cases, the critical junctures primarily involved the final awarding of a terminal development concession under certain institutional requirements (as specified in the lease concession). Theoretically, then, the question of to what extent critical moments require institutional *adaptations* in order to materialize into critical junctures needs further thought. Much depends in that respect on the type of industry (in terms of life cycle and industrial organization) and the political–economic specificities of the region under study.

Empirically, more case-study work needs to be done on the organizational routines of firms in the industry. This is especially relevant as the industry has witnessed processes of integration whereby a few global terminal operators (and various forms of terminal-related partnerships between shipping lines and these global operators) have entered local stevedore markets. How exactly are firm routines and tacit skills influenced by these processes? The port industry has historically been characterized by locally based family businesses (Slack and Frémont, 2009), which typically exerted a strong influence on and interacted with local institutional settings. These businesses are now confronted with different types of business models, often characterized by a strong network orientation and weaker local embeddedness and dependence. A related avenue of future empirical research should focus more on the relationships within the industry, specifically on interpersonal relationships. How, for example, does executive management circulate within port businesses and relevant government agencies? And how do previous business partnerships affect the likelihood of future collaboration at different port locations? How do interpersonal relational networks constrain and enable windows of locational opportunity in port development? These are just some of the questions requiring further empirical scrutiny. In that respect, we believe that the usefulness of our evolutionary perspective is not confined to the Rhine–Scheldt Delta and that it can be applied internationally to other ports in proximity.

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