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PORT COMPETITION IN THE NORTHERN RANGE FROM LE HAVRE TO HAMBURG

ABSTRACT

The main European ports of the Northern Range facing strong competition develop various strategies. Rotterdam and Le Havre, fast transit, Antwerp, logistic activities with storage, Hamburg, hub for central and eastern Europe. These strategies will be described in the paper.

All of them are building new container terminals and use new tools in technology of communications to increase traffic and to enable shipping lines to achieve their own strategies. The new equipments will also be analysed.

In the last years, the competition is mainly on the links with the hinterland. Major ports try to enlarge their hinterlands by transshipment, railway corridors, waterway connections and highways. The importance of ports and inland intermodal nodes is growing.

Nowadays, port competition in the Northern Range is located not only in the ports.

KEY WORDS

Northern Range, ports, terminals, information & communication technologies (ICT), hinterlands, intermodal freight transport.

1. INTRODUCTION

From Le Havre to Hamburg, the Northern Range is one of the main port ranges in the world. Within a distance of about 850 kilometres 9 ports are located with more than 25 million tons throughput in 2004, including 5 majors, Rotterdam (352 million tons), Antwerp (152), Hamburg (114), Le Havre (76) and Amsterdam (74) (Table 1). Total port traffic of the range is over 950 million tons.

Due to the European Union environment, total opening of the borders, enlargement of its territory, the ports of the Northern Range compete with the other European port ranges, mainly with the Mediterranean Range, and also with each other, in serving the enlarged European hinterland, including non-member countries of the EU.

Classical determinants of port competitiveness based on the existing literature include port (terminal) operation efficiency level, port cargo handling charges, reliability, port selection preferences of carriers and shippers, depth of the navigation channel, adaptability to the changing market environment, landside accessibility and product differentiation. But some spatial factors and divergent actor's strategies seem to explain some evolutions.

The cases of the three majors ports Rotterdam, Antwerp, Hamburg, and Le Havre will be discussed in the paper as representatives ones.

Table 1 - Total throughput in the Northern Range (millions metric tons)

	2004
Rotterdam	352.4
Antwerp	152.3
Hamburg	114.5
Le Havre	94.1
Amsterdam	72.1
Bremen Ports	52.3
Dunkirk	51. 0
Zeebrugge	31.8
Ghent	24.9

Sources: Port of Rotterdam Authority, Port of Antwerp Authority

2. PORT STRATEGIES: SPECIALIZATION OR DIVERSIFICATION

Obviously there is not a single strategy of development in the ports of the range. If some trends are the same everywhere, we can notice differences, the basic one being the trend towards specialization or diversification. It is therefore a particularly appropriate case for investigating these various strategies

2.1 Fast transit

All the ports of the range offer fast transit facilities. The main goal is to lose as little time as possible in port operations, loading, unloading, transfer from the sea to continental modes or inversely, at import or export. This requires good accessibility, landside as well as nautical for big ships (Overpoanamax container ships), modern terminals (including the so-called "automated container terminal" where handling facilities are automated and driven by computers based on mechatronics and positioning systems - there are some examples in the Northern range of such automated containers, in Rotterdam: ECT Terminal and Hamburg: Altenwerder terminal, recently opened), good coordination of all the operators, and use of ICT tools (IRSIT, 2004). Some ports as Le Havre invest mainly to ensure such facilities (new container terminal "*Port 2000*") (see part 3).

2.2 Storage and warehousing

The strategy consists in stopping general cargo or bulk flows in the port and offering storage and warehousing facilities. General cargo and bulk stored in the port area are available for any customer. Local firms get benefits from this. Such a strategy is developed mainly in Antwerp and Rotterdam as complement to fast transit. Antwerp built a new warehouse in the past years, for tobacco, mineral fertilizers and chemical products. Rotterdam is a typical import and transit port. It has to face the growth of dry bulk and container flows.

2.3 Logistic activities

Logistic activities concern mainly the container flows. Containers are loaded and unloaded within the port, an activity that creates or maintains employment and creates added value. The ancient parts of the port are used for such operations. Groupage port is a strategy particularly developed in Antwerp.

2.4 Hub for Central and Eastern Europe

After the unification of Germany and enlargement of the EU, Hamburg got back the leader position in central and eastern European hinterland. From 1990 to 2004 the total traffic of the port had the higher increase of the range (86%). Using many feeder and short shipping Ro/Ro lines in the Baltic sea, Hamburg is also a road and railway hub. One of the strategies of Hamburg consists in maintaining and developing the distribution function of the port for central and eastern Europe by creating new container terminals and storage and distribution areas on the port territory.

3. INNER-PORT MODIFICATIONS

All the ports have to modernize their equipments and labour organization.

3.1 New container terminals.

New terminals have been or are being built; especially fast transit container terminals due to the increasing traffic (Table 2).

Table 2 - TEU throughput in the Northern Range ('000 TEU)

	1995	2000	2004
Rotterdam	4787	6275	8281
Hamburg	2890	4248	7003
Antwerp	2329	4082	6064
Le Havre	970	1465	2150
Bremen Ports	1518	2752	3469
Zeebrugge	528	965	1197
Dunkirk	71	149	200

Source: Port of Rotterdam Authority

In Le Havre after Europe and Bougainville terminals, located behind the lock François 1er, fast terminals that means accessible without locking were built in the ancient port, terminal of Asia and Atlantic terminal. To face traffic growth, a new port was built in the south of the ancient part on the quay in the length of more than 4 kilometres where 12 overpanamax ships can berth will be availiable when it will be fully opened. New railway and new roads are under construction in the port area. The single long quay will be also used for trasshippment and feeder connections.

In Antwerp after the Europa and Nordzee terminals, a traffic boost is expected with the recent opening of Deurganck Dock where two terminals will be operated: the Antwerp Gateway terminal already available on the left bank port sites and the *PortofSingapore-Authority(PSA)-Hesse-Noord-Natie(HNN)* terminal to open soon. Each terminal has a capacity of about 3.5 million TEU with nearly 5.3 km of quayside and 255 hectares.

In Rotterdam, in the west of Maasvlakte, a new dock is going to be built, Maasvlakte 2, a 2,000-hectare project. There will be 12 km of quay walls, 625 hectares for handling and storage of containers and also industrial areas.

In Hamburg, the port extension of Altenwerder will cover 281 hectares maintaining its distribution function by developing container terminals and distribution zones.

Most of the new terminals are dedicated to shipowners or private companies, including foreign steve-

doring and port handling companies. They are partly or fully privatized.

3.2 Changes in port management

Two of the ports concerned in this paper, Antwerp and Rotterdam are municipal. The owner of the port is the city. The port of Hamburg is a land property, but the land of Hamburg and the city are almost the same. Le Havre is a state port, administrated as an autonomous organization. For a long time, all the infrastructure and superstructure of the ports have been public. Gradually, private investing was possible for building superstructures. Thus, ports became places of melting capital, public and private. In the last years terminals themselves may be fully privatized. The process of privatization is slower here than in the UK. Some may think that the high level of foreign entrepreneurs, especially non European ones, could be a collapsing factor of the port community and of the port entity. Each actor playing for himself and not for the entire port community. This new form of management influences the choice of ports of call by shipping companies.

3.3 New tools in port management

In addition, comprehensive ICT systems monitor and control today's global chains of transport and a variety of communication services help manage port (and maritime trade).

In the European ports, different ICT applications are employed for documents and information exchange among the various parties involved and the main processes that have benefited from recent technological developments are: tracking & tracing, port management, customs clearance, business transactions, warehousing, routing & scheduling. The traditional closed networks (e. g. electronic data interchange: EDI) are still the preferred communication means exploited (or forced) by all big players. But EDI-based solutions, suitable for operators with own hardware, are beginning to give their place to the modern open and Internet-based networks, which can also be used by smaller players due to their low implementation cost (at the client side no specific hardware nor software is needed). Internet-based application and XML have already been widely implemented and are now used as additional communication means (Giannopoulos, Tyrinopoulos, 2005).

In this way, the 4 main ports of the Northern Range have made significant steps in the integration of advanced ICT and systems; they usually offer simplified data processing procedures such as: networking (as a supplement to hardware EDI connections) between the various operators (even with private systems) and the customs authorities, dematerialization of the administrative documents, advance customs clearance procedures for cargo and very often with an extensive range of customs tools, computerised transit system accessible throughout the territory of the port community.

Two ICT distinct approaches can be observed within the 4 ports since 10 to 15 past years. The first in Hamburg and Le Havre: *"a port community approach"* which is networking all of the local actors together, i. e. port handling companies, maritime agencies, customs and fowarders. The second in Antwerp and Rotterdam: *"an in between approach"* melting, on the one hand, shipping lines' private / integrated approach and, on the other, local players' networking.

In Hamburg, Dakosy (*"Datenkommunikationssystem"*) was founded in 1982 by the transport sector of Hamburg with the objective of establishing a community for electronic data interchange to speed up the process of transshipment. Today, the activities of Dakosy reach far beyond Hamburg and are related to the logistic chains between Hamburg and its hinterland (more than 1300 clients) (*dakosy.de*).

From a single workstation, via interfaces with private systems, the system of Le Havre: Adémar (*"Accéleration Des Expéditions MARitimes"*, initially set and operated by SOGET) and Adémar Plus (the new version under implementation called AP+ connecting also Marseilles) is jointly being developed by the customs authorities and the port community system (more than 350 companies are connected) and enables access to a network of multi-professional databases covering all the transactions related to the transit of goods through the port (Table 3).

Seagha (Antwerp cargo community system) and Apics (*"Antwerp Port Information Control System"*) are Antwerp's two high performance electronic data interchange systems. Seagha was established in 1986 with the aim of facilitating data exchange between business in Antwerp while Apics supports the work of shipping planning and monitors shipping traffic in the port. Since then Seagha has grown into full blown electronic commercial services.

In Rotterdam, the Maritime and Logistic ICT department (MLICT) of Royal Dirkzwager supplies ICT solutions and consultancy in the maritime and logistic market segment. It provides a variety of tailor-made solutions for the whole port, maritime & logistic sector.

Another concern of the present use and unstoppable expansion of advanced ICT systems in each of the 4 main ports remains the business/transport transactions security. But it became also the basic requirement for port users to evaluate their port selection within the Northern range since ports have become a prominent node in integrated logistics chains integrating the new ICT systems considered to be the essential tools.

Table 3 - Well advanced port management & transport -specific IT-applications in the 4 major ports

Port ICT approach	Port IT systems	Tech & electronic environment	IT services
Rotterdam " in between": private/integrated goals + networking local players	(MLICT)Royal Dirkzwager	"offers clients an Internet based Mail System for communicating with vessels at sea and/or other parties involved which can be installed at the office and even at home", XML messaging in a ColdFusion/Unix/Linux based environment	3rd Generation Internet based solutions, new ICT applications for transportation, management, tracking and tracing, and customer information, service and e-business issues, networking between the operators and the customs authorities, dematerialization of the administrative documents, advance customs clearance, seaport documentation for fowarders...
Hamburg "Networking the port community" players	DAKOSY	"Suitable for customers with own hardware and software installations only requiring a service provider for communication"...	
Antwerp " in between": private/integrated goals + networking local players	SEAGHA - Clearing (+ APICS)	intermediary for all networks, offering a "single point of access to the entire world of electronic data communications (UN/EDIFACT) via a single physical communications link"	
Le Havre "Networking the port community" players	Ademar Protis + (AP+)	"high-power network" based on optical fibres, radio-relay systems, radio local loops, information systems, Intranet and Internet services, WAP, GPRS mobility systems	

Sources: based on data from respective port authorities web sites

4. COMPETITION FOR EUROPEAN HINTERLANDS

European hinterlands are non captive but shared. While their close location means that Rotterdam and Antwerp are the two natural gateways to the economic backbone of Europe, *"their role can be challenged by ports with slightly peripheral locations such as Le Havre, which can exploit its position as the first port of arrival and the last port of departure in the North-European range. Vice-versa, Le Havre has no monopoly on services to Paris as the hinterlands of several French, Belgian and Dutch ports overlap in this market area"* (Frémont, Soppé, 2004). In fact, every port is looking for closer links to inland freight distribution centres and customers. They use all modes of continental transportation using port-hinterland-corridors as the main axes for products moving to or from the ports. In spite of some problems associated with road congestion (even if road transportation remains the most important mode in all ports, Table 4) and inadequate railways (railways and waterways have not yet reached their maximum potential in Europe), the quality of inland services in Europe makes ports of the Northern range accessible from any landside point.

4.1 Railway, waterway, motorways, inland-port-(inter)connections

An intense European port rivalry area is located in the Rhine axis, northern France, northern Italy, east-west corridors from the Benelux to the continental European hinterland. According to Notteboom: one can observe the major port competition in serving the continental European hinterland: Rotterdam & Antwerp: local and European hinterland cargo, Antwerp & Le Havre: French cargo, Antwerp & Bremen ports / Hamburg: traffic to/from Germany, Alpine region, northern Italy, central & eastern Europe (Notteboom, 2005). Furthermore, some peripheral markets (excluding central and eastern Europe, see part 3-2) are also accessible from the Northern range, in particular those of the Iberian peninsula. Great Britain is also a market which the shipping lines can either serve directly or by feeder service from a Northern range port.

In Antwerp, the railway connections are adequate but not only as far as the Belgian borders, serving by dedicated freightways Western and Southwestern European continental hinterlands. In Rotterdam, the railway connections are only sufficient as far as the Dutch borders with 7.38% of its total inland transport modal split (2002) (based on total throughput). Hamburg has excellent railway infrastructure connections to channel container flows with a strong orientation to rail shuttles (as in Bremerhaven).

In Antwerp, the waterway connections are good due to the presence of the Albert canal, ABC canal and the Schelde river. The Antwerp total inland transport modal split (2004) considering maritime traffic & traffic with the port industry (based on total throughput) is Barge 42% of the total throughput but mainly on short distances - about 100 km away - and Road 41%, Rail 17%. In Rotterdam, Barging accounts for up to 55.4% of its total inland transport modal split (2002) (based on total throughput).

Table 4 - Container modal distribution in the Northern Range (in %, excluding sea to sea transshipment)

	Rail		Road		Barge	
	1998	2003	1998	2003	1998	2003
Rotterdam	14.5	10	51.3	50	39	40
Antwerp	7.8	9.5	64.5	59.5	27.7	31
Le Havre	14.3	12.4	84.6	82.8	1.3	4.8
Zeebrugge	34.4	40.2	50.6	55.1	15.1	4.7
Dunkirk	9	20.5	90	76.7	1	2.7
Hamburg	29.7	28.7	70.1	69.8	0.2	1.7
Bremerhaven	33.1	30.6	65	67.3	1.9	2

Source: based on data of the respective port authorities

The motorway connection is good in Rotterdam but still suffers from the growing congestion with 6.6% of its total throughput. In Antwerp, the motorways connections are excellent and suffer relatively little congestion. Major road traffic relations in Europe concern France and inland destinations outside the large economics centres in Europe. Thus, in France, competition between Le Havre and Rotterdam regarding relative and natural (road) hinterlands shows that the ports share the Champagne-Ardennes, the Lorraine, the Franche-Comté and the Alsace regions. In addition, competition between Le Havre and Antwerp regarding relative and natural (road) hinterlands shows that the Ardennes, the Alsace and the Lorraine areas remain strongly landlocked into Antwerp's hinterland (DRE H-N, 1999). Bur, ports also compete for Hinterland with feedering operations

4.2 Sea-to-sea transshipments

Transshipment activities are important in all the ports that have been discussed. In Antwerp 16% of the container traffic was operated in 2002 by transshipment (Port of Antwerp). In 2004 in Le Havre 9.1 million tons were transferred from ship to ship, i. e. 11.9% of all traffic. The share was higher for container traffic, 39.4% with 8.5 million of tons (Port of Le Havre). There are two kinds of transshipment. The first one is transshipment from a large ocean-going vessel to another, and the second one is transfer between ocean-going vessels and feeders. Ports of the Northern Range are mainly final destination ports. Ports specialized in transfer of containers between ocean-going vessels are usually located near the main routes. For example, Gioia Tauro or Algeciras. However, transshipment activities occur also in the range. *MSC* has such activities in Le Havre and Antwerp, *Maersk* in Rotterdam and so on. More interesting thinking of competitiveness on the European hinterland is the feedering. But it is difficult to find data for every port. We know that in Rotterdam feedering brings 23.5% (1.2 million TEU) of the container traffic with the hinterland (Rotterdam Port Authority). In 2005 most of the growth of feedering came from the traffic with the Baltic region and especially Russia. The same in Hamburg where apart from few coastal services to German ports and to England, feedering lines are exclusively operated for transit with the countries of the Baltic region, including Russia. Hamburg is the first port of the range for container transportation to and from the eastern Baltic (Kunth, Thorez 2005). It is the last port overpanamax container carriers can reach eastbound. Only smaller ships can sail in the Danish straits. Thus, the geographical position of Hamburg is propitious to develop feedering. In 2004, feedering throughput climbed up to 1.5 million TEU, including 285,000 TEU with Russia (Port of Hamburg Authority).

So, feedering between the Northern range and the East Baltic region, can be paradoxically seen as one of the ways to enlarge the hinterland. That is why stevedores of the northern range ports invest in the Baltic region as *Antwerp Noord Natie* in Ventspils (Latvia) and Hamburg *HHLA* in Sankt Peterburg.

5. CONCLUSION

Nowadays, port competition in the Northern Range is present not only in the ports. Competition is also located in the hinterland and overseas. The influence of outside economic actors is growing. In a liberal environment they have their own strategies. Main actors are shipping companies, shippers-consignees, stevedores and cargo handlers. It is then possible to wonder about the future of ports as single communities and the future of local actors. The unstoppable ICT tools expansion in the major ports of the Northern Range seems to move gradually from port community network (linking all local players) to single integrated and private players e-management solutions. Following this point of view, one can observe the early steps

of the break-up of some of the ports (as single communities) into the juxtaposition of numerous interconnected terminals, small private ports and overseas operators less and less interdependent within every seaport, in their decision-making strategies and due to the influence of outside economic newcomers. So, the next issue could be: what is the future of the main port's governance in the Northern range in a liberal environment (social impacts linked to public port structures, etc.)?

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ABSTRAIT

LA CONCURRENCE INTERPORTUAIRE SUR LA RANGÉE NORD EUROPE DU HAVRE À HAMBOURG

Cet article aborde les diverses stratégies que les ports majeurs de la rangée Nord Europe mettent sur pied face à la très forte concurrence qu'ils subissent dans leur ensemble. Rotterdam et Le Havre développent le transit portuaire accéléré, Anvers les prestations logistiques et l'entreposage tandis que Hambourg se positionne comme une plate-forme pivot pour et vers le centre et l'Est de l'Europe. Ces ports construisent de nouveaux terminaux pour le traitements des trafics conteneurisés tout en utilisant les nouvelles techniques de communications pour accroître leurs trafics respectifs et permettre aux armements de réaliser leurs propres stratégies. L'article présente quelques récents aménagements et projets portuaires en cours (et en devenir). Ces dernières années, la concurrence interportuaire est principalement focalisée sur les relations des ports avec l'arrière - pays européen. Chaque port majeur de la rangée Nord Européenne tente d'élargir son propre arrière-pays par le transbordement mer - mer, les corridors ferroviaires dédiés au fret, les interconnexions modales fluviales et routières. Le rôle des noeuds portuaires et des centres intermodaux de l'intérieur ne cesse de croître. De nos jours, la concurrence interportuaire sur la rangée Nord Europe n'est plus seulement localisée dans les ports.

MOTS – CLÉ

Rangée portuaire Nord Europe, ports maritimes, terminaux, nouvelles technologies de l'information et de la communication (NTIC), arrière – pays portuaires, transport intermodal

REFERENCE NOTES

1. DRE Haute-Normandie: *Mesure des hinterlands et attractivité portuaire,* Report produced by The Observatoire Régional des Transports et Activités Logistiques de Haute-Normandie (ORTAL), 1999, p. 33
2. Buck Consultants International: *Seaports and their hinterland*, Study commissioned by The Dutch national Spatial Planning Agency & The European Commission, 1996, Nijmegen, p. 27
3. **Fleming, D., K., Hayuth, Y.**: *Spatial characteristics of transportation hubs: centrality and intermediary*, Journal of Transport Geography, 1994, vol. 2, pp. 3-18.
4. **Frémont, A. Soppe, M.**: *The evolution of North-European shipping networks: From intercontinental links to a global system, 1970-2000*, 10th WCTR 2004, 2004, Istanbul, pp 1-28
5. **Giannopoulos, G., Tyrinopoulos, Y.**: *Intermodal Freight Transport between Europe and Asia: a structured approach to policy making and problem solving*, TRB 85th Annual Meeting, Washington, 2006, pp 1-20
6. IRSIT: *Port-cities in Europe, comparative analysis. Final report 2004*, Analysis produced for the Institute of Research in Territorial and Industrial Strategy by GDR Libergeo of the CNRS, 2004, Le Havre
7. **Kunth A., Thorez P.**: *Frontičres et transport, frontičres de transport. Continuités, mutations entre l'Ouest et l'Est de l'Europe*, Revue d'Etudes Comparatives Est-Ouest vol. 36, 2005 pp11-42.
8. **Marcadon, J.**: *Containerisation in the ports of Northern and Western Europe*, GeoJournal 48: 1999, pp 15-20
9. **Notteboom, T.**: *Governing Port-Hinterland Relationships: Experience from Antwerp*. International Workshop on New Generation Port-Cities & their Role in Global Supply Chains, Hong-Kong, 2005, pp 248-267

PORT WEB SITES

www.portofantwerp.be
www.portofrotterdam.com
www.hafen-hamburg.de
www.lehavre-port.fr