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54-55

rivista di architettura delle infrastrutture nel paesaggio

PORTI E CATENE LOGISTICHE GLOBALI

In copertina: veduta aerea del Container Terminal di La Spezia. Foto fornita da Contship.

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TRASPORTI

cultura

Ports and global logistics chains

by Laura Facchinelli

This issue of Trasporti & Cultura is dedicated to ports, to their work, to today's reality and to the prospects for Italian ports, and to a comparison with other European ports.

Ports are fundamental infrastructures for cargo traffic, and consequently for the economy of a country. The opening article underlines how transportation and infrastructure policy should seek to reduce the market inefficiencies and imperfections that crop up along the logistic chain. The cost of services, that weigh on the consumer price of products, must be reconsidered; it would be important to focus on ports that make it possible to limit the route from the point of origin to destination, with the purpose of reducing costs and benefitting the environment.

Measuring connectivity and efficiency is the first step towards improving the performance of a port and how competitive it is on the market: this is an important issue, because port performance and services are a critical factor that can have an impact on the economic development of a country.

Northern European ports base their success on efficiency, and on their planning capacity. The ports of Antwerp and Rotterdam form a port-industrial complex of international significance, which also includes other minor realities in the Dutch-Flemish area. These ports play an important strategic role, which in recent decades has grown with the rapid rise of container traffic; equally important considerations are employment and the added value generated there. For the future, experts emphasize the need to reinforce intermodal connections with the inland surrounding the port, developing internal navigation routes and railways.

The activities required to develop the processes inside a port are distributed among a multiplicity of subjects, individuals and organizations. There can be many factors of crisis. It will take strategies, investments and managerial capacity to avoid stagnation or decline. A strategic response is to become a smart port, with trained personnel, intelligent and automated infrastructure, collaboration between various interest groups.

This is the content of the opening articles, focused on planning and managerial organization. The articles that follow analyse several case studies of Italian ports: Trieste, aware of the strategic role it derives from its location in the heart of Europe and at the northern tip of a "great sea" open to the world; Venice, a port that will be analysed with a focus on the functionality of the railway infrastructure, which is key to the connection with the mainland; Genoa, a port in constant evolution, which will be examined in terms of the recent challenges to improve the connection between port and dry port (the last port mile) and the technologies that serve the port itself; Naples, where the theme of railway connections is a core issue in planning, to bridge a gap that is a negative factor for most of southern Italy. Another article is dedicated to the ports of Taranto and Gioia Tauro: in the matter of great port terminals dedicated to container trans-shipment it addresses the theme of economic-regional development and the efficiency of logistics in support of southern Italy's manufacturing industry.

The overview is extended with an analysis of the important role of special economic zones in the development of ports and the industrial system; with a comparative study between the ports of northern Italy and those of northern Europe in terms of the economy and the environment; and with general considerations on the current state of the port system in Italy.

Because this magazine has always liked to draw comparisons with other geographical areas, there is also an article about Singapore where the small size of its territory makes the management of port, urban and industrial spaces a constant challenge in terms of guaranteeing efficient mobility. It should not be forgotten that a port is not just a productive centre, it is also an area adjacent to the city. It is important to consider issues of city planning, arising from the need not only to occupy areas vacated by the reorganization of port activities, but in a wider sense, to build relations that have been interrupted for many years.

Finally, inspired by a little-known phenomenon, an architect explains how a container may be used to build an exhibition space, or more and more often, an actual building: a new trend, which is not only useful for recycling cast-off structures, it is also interesting as an idea for innovating architectural design.

TRASPORTI & CULTURA N.54-55

Porti e catene logistiche globali

di Laura Facchinelli

Questo numero di Trasporti & Cultura è dedicato ai porti, alla loro attività, alla realtà presente e alle prospettive dei porti italiani, ad un confronto con altri porti europei.

I porti sono infrastrutture fondamentali per il traffico delle merci, e quindi per l'economia di un paese. Nell'articolo di apertura si sottolinea che la politica dei trasporti e delle infrastrutture dovrebbe puntare a ridurre le inefficienze e le imperfezioni di mercato che si manifestano lungo le catene logistiche. Occorre ripensare i costi dei servizi, che gravano sui prezzi finali dei prodotti; sarebbe opportuno puntare sui porti che consentono di ridurre al minimo il percorso dal punto di origine a quello di destinazione, allo scopo di ridurre i costi e apportare benefici per l'ambiente.

Misurare la connettività e l'efficienza è il punto di partenza per migliorare le prestazioni di un porto e la sua competitività sul piano commerciale: questione importante, perché le prestazioni portuali sono uno dei fattori critici che possono influenzare lo sviluppo economico di un paese.

I porti del nord Europa basano il loro successo proprio sull'efficienza, oltre che sulla capacità di programmazione. I porti di Anversa e Rotterdam formano un complesso portuale-industriale rilevante a livello internazionale, che comprende altre realtà minori dell'area fiammingo-olandese. Questi porti svolgono un importante ruolo strategico, che si è potenziato, nei decenni recenti, per la rapida crescita del traffico dei container; altrettanto importanti sono da considerare l'occupazione e il valore aggiunto che vi è generato. Per il futuro, gli esperti sottolineano che si dovrà rafforzare l'intermodalità dei collegamenti con l'entroterra portuale, puntando su navigazione interna e ferrovie.

Le attività necessarie per sviluppare i processi, all'interno di un porto, sono distribuite tra numerosi soggetti, individui ed organizzazioni. Molteplici possono essere i fattori di crisi. Per evitare la stasi o il declino occorrono strategie, investimenti, capacità gestionale. Una risposta strategica è diventare un porto smart, con personale preparato, infrastrutture intelligenti e automatizzate, collaborazione fra i vari gruppi di interesse.

Fin qui i contenuti degli articoli di apertura, che riguardano la progettualità e l'organizzazione gestionale. I contributi successivi analizzano alcune realtà portuali italiane. Trieste, consapevole del ruolo strategico legato alla propria collocazione nel cuore d'Europa e al vertice settentrionale di un "grande mare" aperto al mondo. Venezia, realtà della quale si analizza la funzionalità delle infrastrutture ferroviarie, fondamentali per il collegamento con l'entroterra. Genova, porto in continua evoluzione di cui si delineano le recenti sfide per il miglioramento della connessione tra porto e retroporto (ultimo miglio portuale) e delle tecnologie a servizio del porto stesso. Napoli, dove il tema dei collegamenti ferroviari è al centro della programmazione, per superare un gap che segna negativamente un po' tutto il Mezzogiorno. Un ulteriore contributo è dedicato ai porti di Taranto e Gioia Tauro: a proposito dei grandi terminal portuali dedicati ai traffici di transhipment nel settore container, si affronta il tema dello sviluppo economico-territoriale e dell'efficienza della logistica a supporto dell'industria manufatturiera del sud Italia.

La panoramica si amplia con un'analisi sull'importante ruolo delle zone economiche speciali per lo sviluppo dei porti e del sistema industriale; con un confronto fra i porti del nord Italia e quelli del nord Europa in termini economici e ambientali; con una riflessione generale sullo stato presente della portualità del nostro paese.
Dato che a noi della rivista piace, da sempre, il confronto con altre realtà geografiche, ecco una testimonianza su Singapore dove, a causa della limitata estensione territoriale, la gestione degli spazi portuali, urbani e industriali rappresenta una sfida costante per garantire un'efficiente mobilità.

Non va dimenticato che un porto non è solo una realtà produttiva, ma anche un'area confinante con la città. Importante la riflessione urbanistica, che nasce dall'esigenza non solo di occupare le aree dismesse a seguito della riorganizzazione delle attività portuali, ma, in senso più ampio, di costruire relazioni che sono state interrotte per molti anni tra il porto e il contesto retrostante, urbano e territoriale.

Infine, prendendo spunto da un fenomeno ancora poco noto, un architetto spiega come si può utilizzare un container per costruire uno spazio espositivo o, sempre più spesso, anche un vero e proprio edificio: una tendenza nuova, non solo utile per riciclare strutture non più utilizzate, ma anche interessante come spunto per l'innovazione nel progetto di architettura.


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The Northern-European ports: current situation, success factors and future trends

by Thierry Vanelslander

In the period after the second World War, the Rhine-Scheldt Region experienced a strong dynamic. With the surge of big innovation initiatives in the petrochemical sector, the ports of Antwerp and Rotterdam started developing a port industrial complex of world scale, complemented with developments in the ports of Ghent, Terneuzen, Zeebruges, Flushing and the inland ports of Moerdijk and Dordrecht. The area was called then the 'Gold Delta'.

In the 70's of the previous century, the rapid expansion came to and end, and the Gold Delta took another direction of development. A reduction in the transfer volumes of the early 80's made the gold border gradually disappear. However, the surge of the container and its related activities led to a renewed growth dynamic in the Flemish-Dutch Delta. Rotterdam and Antwerp were part of the top 10 container ports in the world at that time. From the 90's, an important amount of distribution centers developed in the Netherlands and Belgium. Those distribution centers featured a lot of storage and processing of the contents of the containers handled, termed 'value added logistics' and 'postponed manufacturing'. This logistics infrastructure is closely related to the large seaports through which those containers, coming from overseas locations mainly - especially Asia and China, is being transferred.

An important characteristic of the ports in the Delta is their diversity. Next to Antwerp and Rotterdam, there are smaller ports, each with their own strengths. Ghent features steel industry and breakbulk and a powerful development in the biomass domain. Ostend is specialized in roro and special equipment transport (like windmills), with biomass potential. Zeebruges has a lot of roro, and furthermore container transport activities, which have reduced over the past decade, but got revived recently with the advent of Chinese Cosco. Furthermore, Zeebruges has a lot of potential for energy development. Flushing is a strong breakbulk port with important plans for the container segment. Terneuzen has a strong chemical sector with biomass potential. Moerdijk is an industry port, with plans for distribution centers. Dordrecht finally has a strong industrial function and plans for the development of breakbulk.

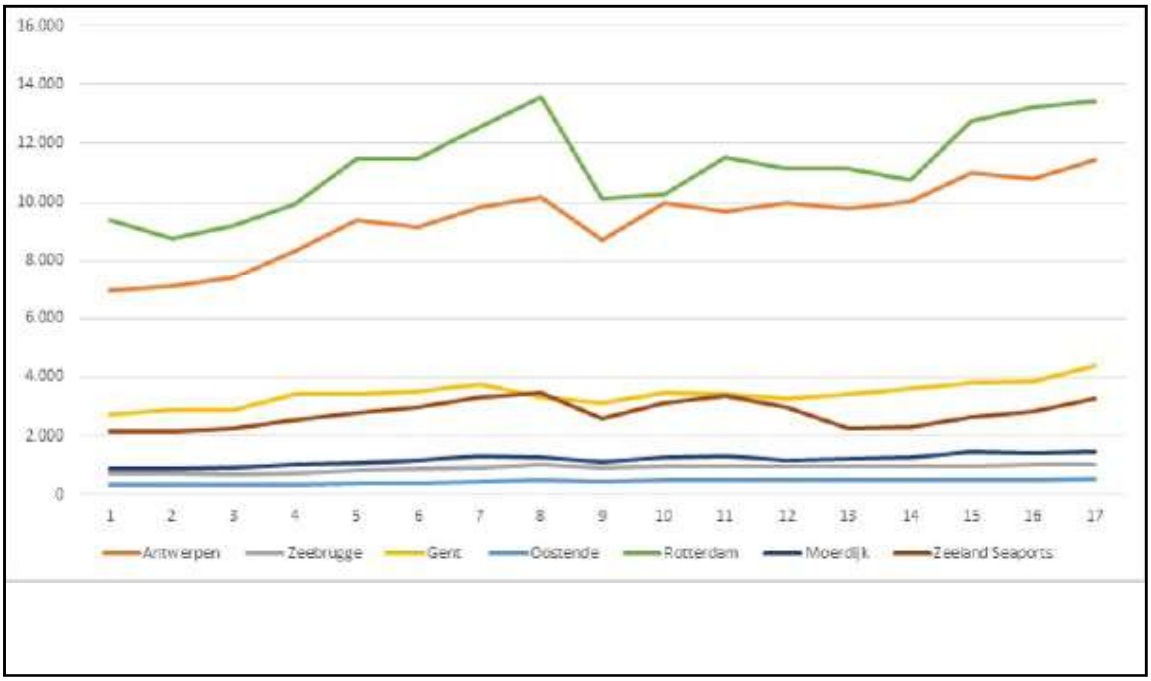
The seaports are the most important characteristic of the Flemish-Dutch Delta as the entry gate to the European hinterland. These seaports fulfill an important strategic role for importers and exporters, together with elements like connectivity, logistics advantages and cluster powers. The ports together make up for a throughput of 755 million tonnes and 21 million TEU's in 2018 – nearly one

I porti dell'Europa del Nord: la situazione attuale, i fattori di successo e l'andamento futuro

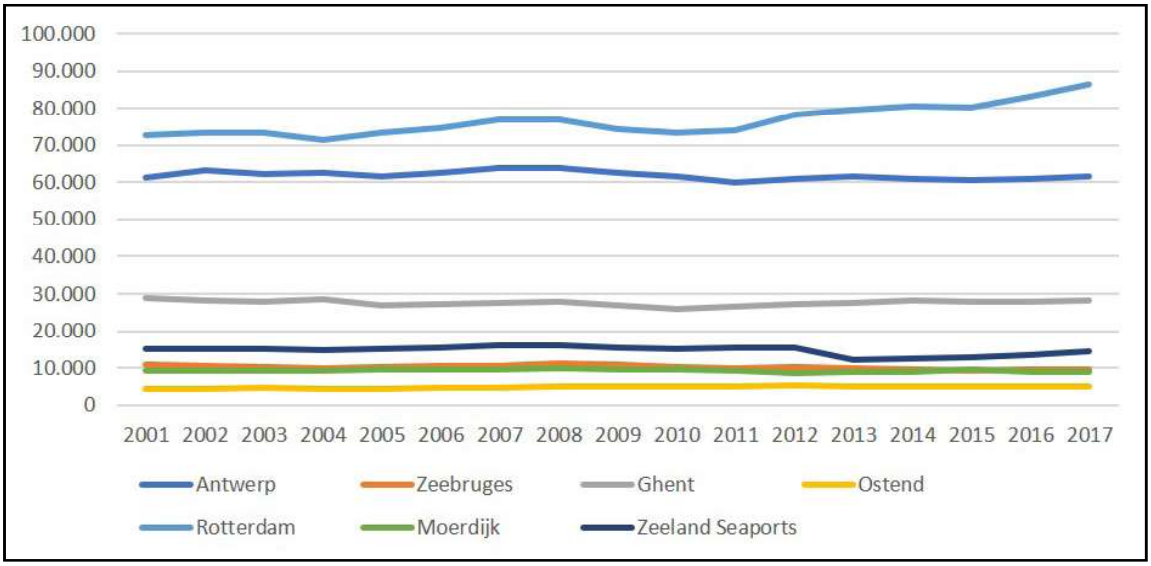
di Thierry Vanelslander

Con le grandi innovazioni nel settore petrolchimico, i porti di Anversa e di Rotterdam hanno iniziato a sviluppare un complesso portuale industriale su scala mondiale, integrato con gli sviluppi dei porti di Ghent, Terneuzen, Zeebruges, Flushing e dei porti interni di Moerdijk e Dordrecht. La rapida crescita dei container e delle relative attività hanno portato a una rinnovata e dinamica crescita del delta fiammingo-olandese. Questi porti svolgono, insieme ad altri fattori quali la connettività, i vantaggi logistici e i poteri del cluster, un importante ruolo strategico per gli importatori e gli esportatori. Accanto al ruolo strategico dei porti, sono di grande importanza l'occupazione e il valore aggiunto ivi generato. I porti nell'area presentano una serie di sfide: si è osservato nell'ultimo decennio un aumento della quantità di investimenti cinesi in Europa e un ruolo crescente delle fonti di approvvigionamento vicine. Infatti durante l'ultimo decennio gli altri porti europei sono diventati tutti più forti dei porti del delta fiammingo-olandese e, riferendosi al solo commercio di container, la crescita aumenta in maniera continua. L'applicazione della sincronia modale è un elemento importante nella generazione di ulteriore capacità di traffico nell'entroterra portuale. Inoltre, è necessario rafforzare la rete intermodale con linee dedicate di navigazione interna e ferrovia e con servizi regolari, in modo da raggiungere in profondità l'entroterra europeo tramite terminali intermodali. Infine l'articolo propone il quadro di un possibile futuro dei porti del delta fiammingo-olandese.

In the front page, at the top: Container ship at the port of Antwerp (source: www.europeanceo.com); bottom: view of the containers dock and container stocking site in the port of Rotterdam (source: www.civitatis.com).



1 - Total throughput Flemish-Dutch Delta ports (thousands of tonnes) - Source: Eurostat (2019).

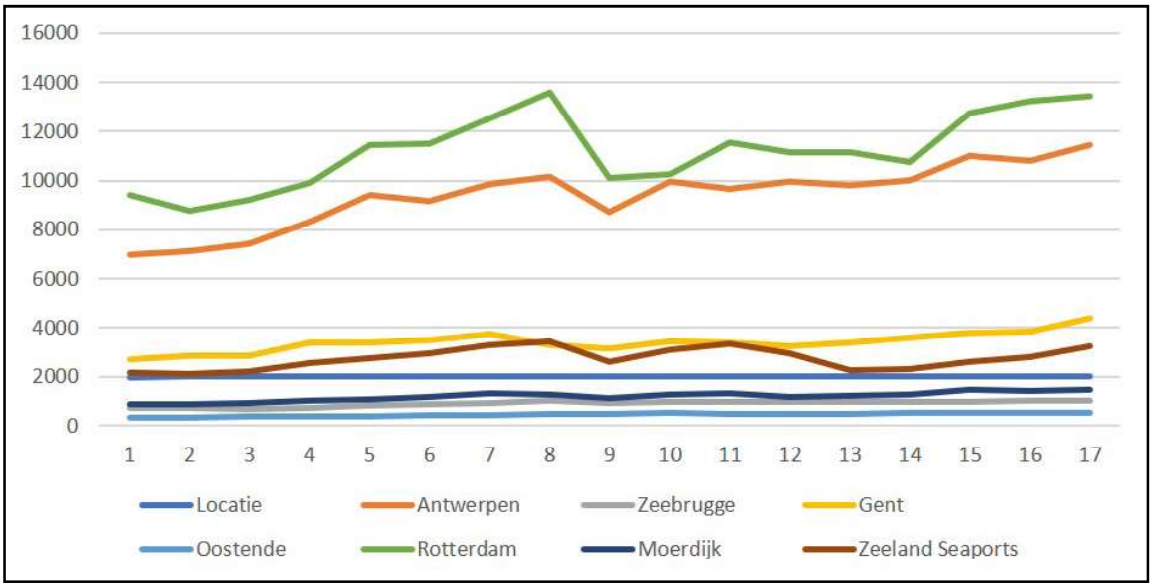


2 - Total employment Flemish-Dutch Delta ports - Source: National Bank of Belgium (2019) and van der Lugt et al. (2018).

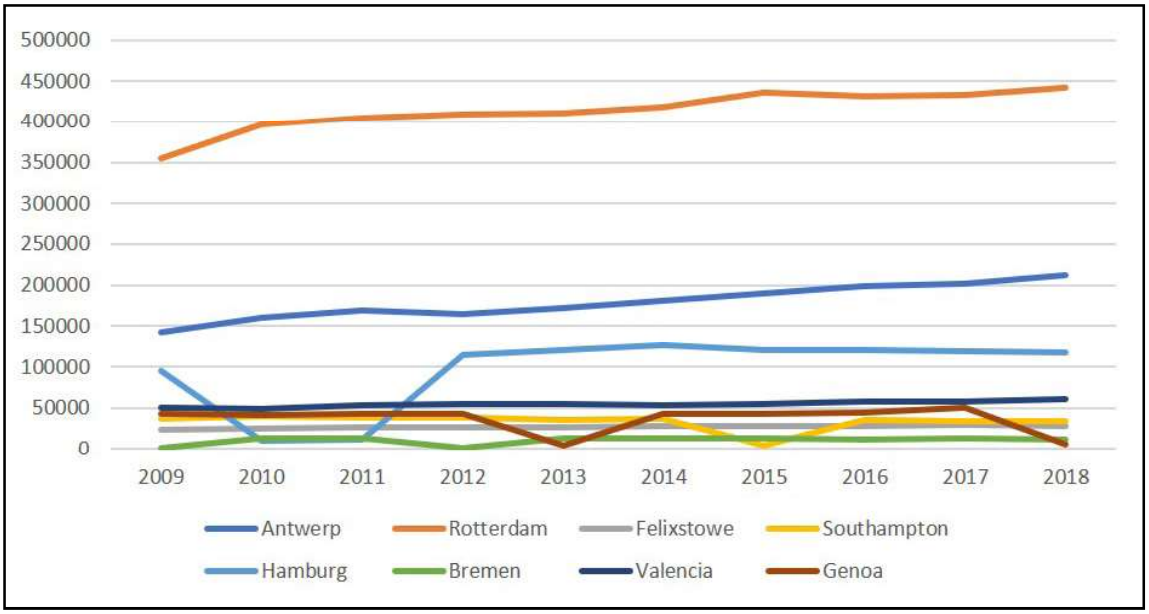
fifth of the total European throughput. In the container segment, the Delta even represents a quarter of the total European volume. The throughput has risen, after the 2009 dip, from 655 million tonnes in 2009.

Next to the strategic role of the seaports, the employment and the value added generated in those seaports is of strong importance. That concerns both direct and indirect employment and value added. Ports deliver goods and services to many sectors, but also themselves take up important volumes. It is clear that the economic effects are very large: they total a value added of many billions of euro, and many hundreds of thousands of jobs.
In the period before 2008, the direct employment in the Delta ports increased. As of 2008 till 2011, employment decreased by about 5%. In the years after, employment remained more or less stable. Industrial employment in the ports dropped slightly. Apparently, port labour has recovered less rapidly from the 2008 global crisis. As port traffic has been increasing, that also implies that more port traffic has been handled with a volume of labour that has not increased to the same extent. That is possible thanks to mechanisation of cargo handling and storage, application of ICT, increased containerization and the location of capital-intensive industries in ports.

The value added of the Delta ports shows a picture that deviates again, just like for labour, from that of their wider economies: while both economies together grew by 7% since the 2008 peak, the seaports stayed behind, and in 2014 still were below the 2007 level. Between 2003 and 2014, the Delta ports' value added increased by about 35%. The crisis year 2009 marked a significant drop. The fact that the value added in the total Dutch and Flemish economy grows stronger than that of its ports, can be caused by a number of port-related activities that may have moved outside the port areas, as a consequence of containerization and ICT technologies. That is valid in particular for activities that are part of the so-called 'logistics layer' around the ports' activities. Also, general service sectors like healthcare, IT, creative jobs and business servicing grow strongly outside port regions.



3 - Total value added Flemish-Dutch Delta ports (million euro, running prices) - Source: National Bank of Belgium (2019) and van der Lugt et al. (2018).

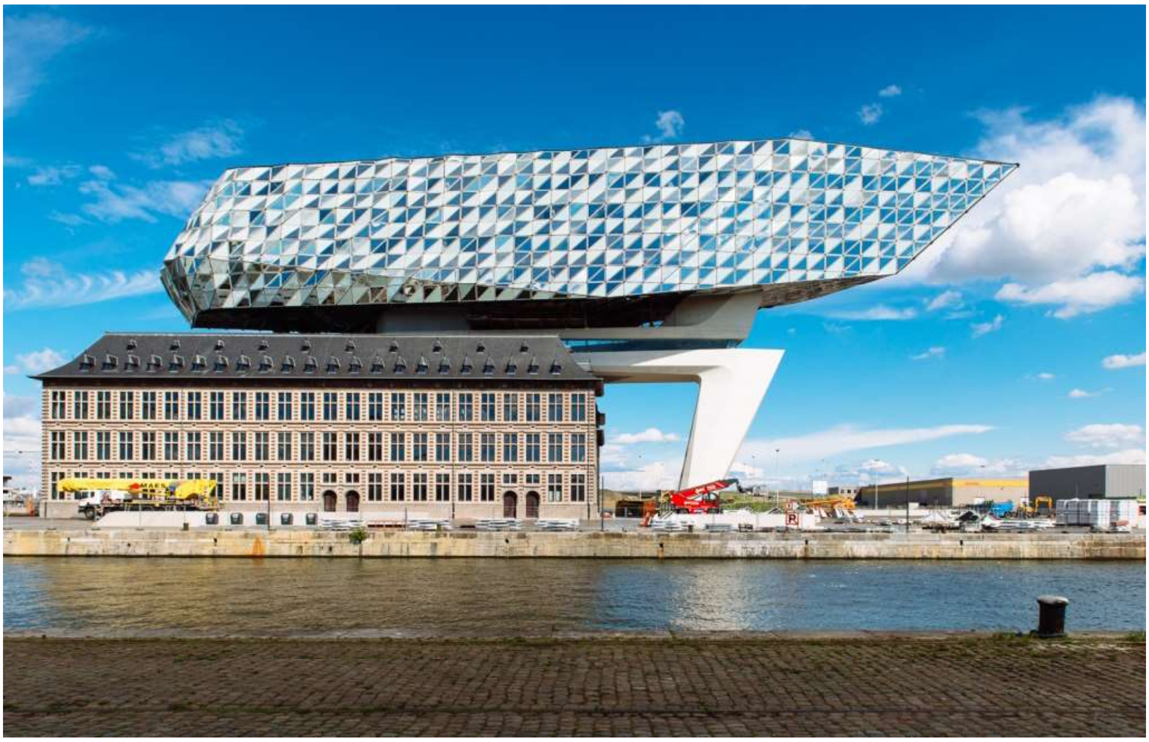


4 - Total throughput selected European ports (thousands of tonnes).

The ports in the area feature a number of challenges. Container flows kept on growing in the first two decades of the 21st century – both in absolute and in relative numbers, shippers kept on using more and more containers. However, it took more than a decade for the negative macro-economic developments of the 2008 bank and subsequent economic crisis to be digested. Important conditions for a sustained growth in the future are the sustained growth of the Far East, and Europe to continue to play a strong role in global trade systems. A further reason is Europe's continued welfare increase, and Central and Eastern Europe in particular. The last decade, an increased amount of foreign Chinese investments has been observed in Europe. We also see an increasing role of near sourcing, which is the buildup of production capacity in Eastern- and North-Africa. Finally, demographic developments in Europe are such that the population is ageing and shrinking.

The other European port ranges all grew stronger than the Flemish-Dutch Delta ports during the last decade. Felixstowe and Southampton, even though much smaller than Antwerp and Rotterdam, grew stronger, just like Genova and Valencia, as examples of South-European ports. Hamburg is the only other port that has somewhat similar volumes as Antwerp and Rotterdam, but its growth was slower, mainly due to water depth and related port access problems in its approach river Elbe. The market share of the Flemish-Dutch Delta ports in the Hamburg–Le Havre range was about 60% in 2018.

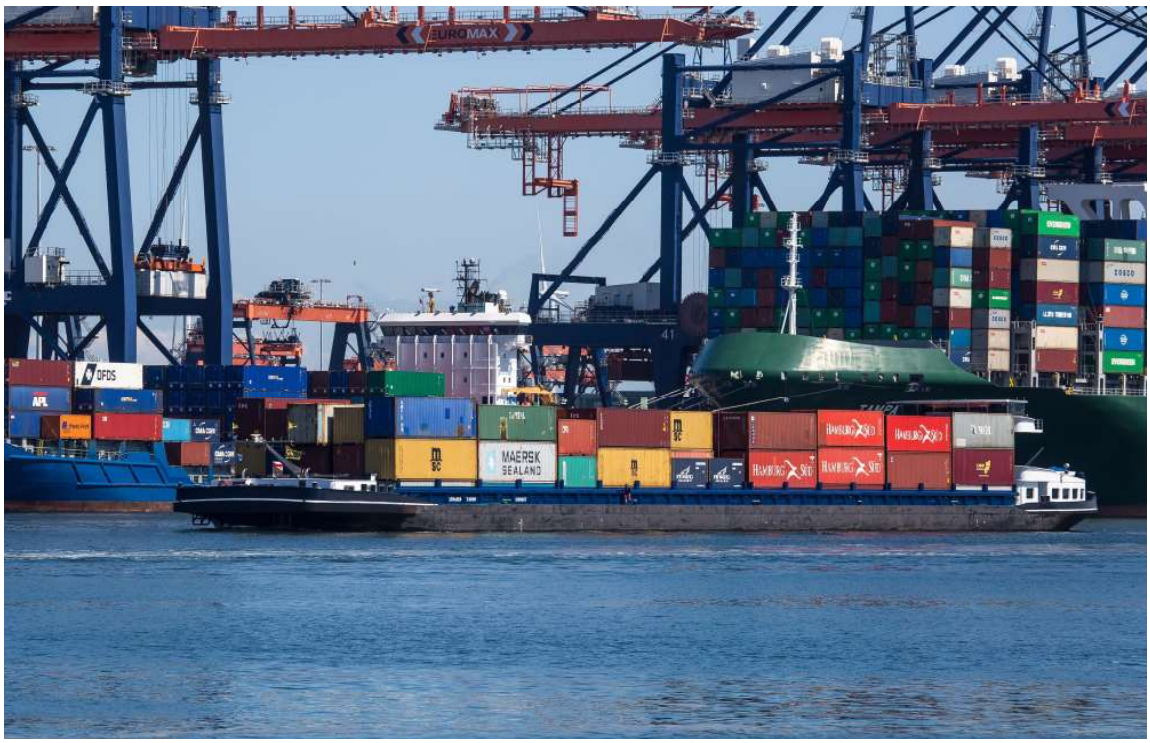
In the container trades, the scale increase persists and competition between ports and container terminal operators in these ports is an important driver. Maritime accessibility is a crucial determinant in the ports' competitive power. But also the land side brings challenges. Next to the connection to the multimodal networks, there is substantial inter-mainport traffic: connections via inland navigation and rail between the ports of Antwerp, Rotterdam and Zeebruges. More than in 'regular' hinterland traffic, containers between the three hubs are mainly exchanged via rail and inland navigation. That leads to capacity issues on the concerned waterways and rail tracks. Dynamic traffic management is necessary for a well-functioning inter-mainport traffic. For smooth handling in the ports, dedicated terminal infrastructure is re-



5 - Headquarters of port authority of Antwerp (source: www.ttnotes.com).

6 - Containers dock in the port of Rotterdam (source: www.holland.com).

quired, where short sea and inland navigation vessels can be efficiently handled.
An important element in generating additional hinterland traffic capacity, is applying synchromodality. That is a concept launched by the industry, focusing on a flexible use of transport and infrastructure capacity and traffic management over various transport modes. Traffic is the supported and steered by actual information on congestion and availability. Ideally, traffic managers can combine partial loads with those of their colleagues, so as to increasing loading degrees and densify flows. The advantage is that in case of calamities, traffic can easily be shifted to segments or modes where capacity is available.
Further on, the strenghtening of a robust intermodal network of dedicated lines with regular services of both inland navigation and rail is needed, so as to reach deep into the European hinterland via intermodal terminals. That network should be connected to the maximum to the European TEN-T networks. Rotterdam has its Betuwe Line half finished, allowing for a rail connection with Germany at reduced capacity. For Antwerp, the historical Iron Rhine has not been re-established yet, so that trains still have to use the alternative Montzen route. A speeding up of legal processes and procedures is needed. For the connection with the North of France, the Seine-Nord connection, connecting the Belgian Scheldt basin with the Paris Seine basis has just been decided and approved by the French government. As dredging becomes an issue, the inland waterway sector needs to look for alternative solutions, like shallow and autonomous vessels.
Via feedering, goods are brought from and to the



7 - Containers dock in the port of Amsterdam (source: www.portofrotterdam.com).

8 - Transhipment facility in the port of Rotterdam (source: /www.stigdelta.com).

main Delta ports to the European secondary ports in a hub-and-spoke system. Other shipping companies use different loops to sail to different European ports.
As cost remains the prime criterion in hinterland transport choice, if one wants to achieve sustainable transport, all external costs should be fully internalized and passed on to users, for all modes according to the same principles.
The key to the success of the Flemish-Dutch Delta is the value added of intercontinental container hubs, airports, intermodal infrastructure and logistics enablers like high-value IT infrastructure and renewed logistics concepts like synchromodality. Due to that combination of factors, the region will keep its attraction to direct foreign investment aimed at logistics centers. The accessibility towards the hinterland is superior and coupled to integrating the last available innovative logistics concepts.
Three important developments are linked to logistics infrastructure. The first one is sustainability. Distribution centers have to contribute to sustainable development and limiting the carbon footprint. The scale of those centers is increasing. Therefore, there is a need for those centers to connect to sustainable transport modes. The trend of dispersion and flexibilisation of flows does not al-

9 - View of container docks in the port of Antwerp. Fonte: www.docksthefuture.eu

10 - Ship docked to the port of Amsterdam (source: www.shipspotting.com).

ways match sustainability.
The second influencing development is related to the characteristics of world trade. The current environment of Brexit, a weakening Europe and trade wars between China and the US hampers economic growth and especially also the trade flows to and from the Delta.
The third influencing development is the containerized character of import flows. Sea containers are increasingly directed towards direct distribution from ports to large-scale retail and industry, passing by European distribution centers. This requests suitable IT for visibility, traceability and safety.
Growth of the impact of the container combined with increased transport in the Delta demands understanding among an active support from citizens. Support emerges from involving stakeholder associations at an early stage in plans and investment projects. A dialogue with society is a must not only for new projects, but also for strategic points of attention like decreasing growth, problems with labour markets, etc.
Despite the introduction of the North Sea Emission Control Area zone, the investments that Europe co-financed in port and hinterland infrastructure in South-Europe, the introduction of road tolls in a number of European countries on the big axes, etc., the Flemish-Dutch Delta ports remain the dominant entry gate to Europe for most shipping companies and large trade flows. It is the position of the Delta in so-called *Blue Banana* (Hospers, 2003) and the rapid access to the highest concentration of purchasing power in Europe that

makes that the Delta ports are still the biggest gateway to Europe. The hinterland of the Delta ports even further expands: the European center of gravity through the past decade has shifted eastward, with those new areas increasingly being served through Delta ports. In latest years, this shift has come to an end. This is largely due to the fact that economies on Europe's east side, both north and south, compensate each other. The decrease of the Greek economy compensates for the gain in Romania, Poland and all regions in between.
However, it is not evident that the Delta ports, and the Northern-European ones in general, will keep that strong position. Figure 11 shows in light blue the hinterland of the Delta, with in red and turquoise the areas with strong competition with other port regions. The cost of reaching Europe's center of gravity from the Delta ports increased from 855 euro per TEU in 2001 to 881 euro per TEU in 2014, taking into account that the center of gravity has shifted eastwards by 300 kms.

In terms of trading partners, the sanctions against Russia since 2015 meant a serious blow of the trading relationships and volumes of Belgium and The Netherlands, and in particular of their ports. At the same time, Ireland emerges as an important trading partner. Both Russia and Ireland are the only country with more exports to than imports from Belgium and The Netherlands. Tzechia and Poland remain consequent high growing trading partners, mainly from an export point of view. France and Russia remain the biggest export trading partners. Italy, Ireland and Poland are the biggest growers in absolute volumes.
So, it remains to be seen what the future will bring for the Flemish-Dutch Delta ports. How will international trade evolve? Will the chemical and energy sector remain the stronghold industry in ports like Antwerp and Rotterdam? Will the Chinese Belt and Road initiative create a shift to South-European ports as the new entry gates to Europe? Will climate change and measures to prevent and mitigate it impact on the Delta ports' market power and share? Very important questions, many of which are too big for a port, even a big one, to influence actively. So, strategy updating and, new for most port authorities, teaming up with other port authorities and other actors in supply chains, will become a must.

Bibliography

Eurostat (2019) *Transport Database–Maritime.*

Hospers, G. J. 'Beyond the Blue Banana?' *Intereconomics* 38, no. 2 (2003): 76. doi:10.1007/BF03031774.

Hintjens, J., van der Horst, M., Kuipers, B. and Vanelslander, T. (2016) *Vlaams-Nederlandse Deltamonitor.*

National Bank of Belgium (2019) *The economic importance of the Belgian ports: Flemish maritime ports, Liège port complex and the port of Brussels – Report 2017.*

Van der Lugt, L., Witte, J., Becker, E. and Streng, M. (2018) *Havenmonitor - De economische betekenis van Nederlandse zeehavens 2002-2017.*

Van Hassel, E., Meersman, M., Van de Voorde, E. and Vanelslander, T. (2016) 'Impact of Scale Increase of Container Ships on the Generalised Chain Cost'. *Maritime Policy & Management* 43, no. 2

11 - The hinterland of the main European container ports - Source: Hintjens et al. (2016), based on van Hassel et al. (2016).

12 - Containers dock and railway transhipment area in the port of Amsterdam (source: www.portofrotterdam.com).