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Cooperation between Waterways and Railways, an Unnatural Alliance Rail Strategic Development of River Ports in the Greater Paris Region

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Abstract

Rail-river transport combination is rare and generally difficult to implement. However, there is today an emerging interest in the possibility of complementarity between the two bulk transports. The idea is supported by public authorities as an alternative solution to freight transport by road. The paper seeks to identify the possible ways in which waterways and rail can complement each other in river ports and under which circumstances they could offer a new arrangement for supply chains. The case study of the Ile-de-France region points out the specific conditions required to develop such services for two specific markets (aggregates and containers). This exploratory study relies on in-depth interviews with the major transport operators and infrastructure authorities in the Seine corridor. It intends to draw new perspectives on town and regional planning for the logistics organization of the Greater Paris and generally for freight management in major metropolitan areas.

Keywords: Rail; River port; Combined transport; Ile-de-France; urban logistics

Résumé

Les relations entre transports ferroviaires et fluviaux ont surtout été envisagées sous l'angle de l'impitoyable concurrence à laquelle se sont livrés les deux modes pour le transport de masse. Aujourd'hui toutefois, un intérêt croissant est porté à leur éventuelle complémentarité. Ce discours encore en émergence est porté aussi bien par les grands opérateurs de transport dans le couloir de la Seine que par les autorités portuaires qui ont hérité des installations ferroviaires portuaires. Le rapprochement des deux modes est aussi vivement encouragé par les autorités publiques avec pour ambition de faire jouer aux ports leur rôle de plates-formes multimodales en cohérence avec une politique de transfert modal. Cette contribution cherche à établir les possibles complémentarités entre les transports fluviaux et ferroviaires dans un contexte francilien, une perspective qui n'a pas fait jusque-là l'objet de travaux systématiques.

Mots-clé: Rail ; Ports fluviaux ; Transport combinés ; Ile-de-France ; logistique urbaine

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1. Introduction.

Rail and waterways are mainly regarded as competing transport modes, especially in the massed cargo connections from the seaports. Combining two bulk transports is complicated and seems to make less sense from an economical point of view. However, rare exceptions of such offers exist on the Rhine in Duisburg and Basel, as main continental hubs where goods and especially containers are partly shifted from the barge to the train. A large catchment area and strong links with the national rail operator may explain these exceptions. The other ports on the Rhine and elsewhere in Europe, although they may be well connected to the rail system and sometime dispose on their own installations (cf. Dourges in the North of France) haven't developed similar offers (Beyer, 2011 and 2012). So pre- or post-shipping are carried out by road haulage. From the seaports themselves, rail or barge services remain alternative and competing routes to the hinterland. However the recent development of hinterland strategies to a more complex and integrated system (Notteboom & Rodrigue, 2009 & 2012) and the ambitious public policies to reduce road transport gives an opportunity to reconsider how rail/waterway combination may be a realistic option to be implemented. Our research will focus on the Greater Paris region where important shifts have occurred and may induce a possible change in the modal coordination: the rapid development of the container traffic from Le Havre to the Ile-de-France, a proactive political programme on modal shift stated at national and regional level (Grenelle 1 and 2 Acts, the Ecotax etc.) (CAS, 2012) that won't be by far not reached as the rail freight volumes dramatically dropped during the past decade, the port reforms of 2008 that gave the maritime ports and France's two largest river ports (Paris and Strasbourg) a leadership and promotion role for multimodal transport, the specific access constraints to the central urban area and lastly, the recent property transfer from the rail port infrastructure to the port authority. The carriers themselves consider a modal shift with interest to reduce their carbon emissions (by conviction or for commercial reasons) and in order to avoid increasing road congestion in metropolitan areas but only when run at the same costs level (Van Schijndel, Dinwoodie, 2000) (Tsamboulas, 2005). All those points encourage to reconsider the place of the rail within a global port strategy. The research objective is to consider how those trends could enhance the cooperation between rail and river despite of the economical and territorial constraints. The methodology followed relies on an inductive geographical and regional planning approach centred on a case study. It gives a preminent place to consideration on spatial development and territorial management aspects so that the transportation cost-advantage criteria have been less developed for themselves in the text. After a short presentation of the overall context, the argument of the paper is successively devoted to a theoretical approach based in a typology of possible combinations between rail and river transport that can be applied to the Parisian case. A following section presents the current situation and infrastructural constraints that shapes the alternative transport offer in the Greater Paris. The fourth part relies on in-depth interviews with major economical actors in the field that allow to draw two contrasted situations and possible organizational logistics patterns changes: one for aggregates and the other for the container. The conclusion highlights the opportunities but also the limits of a possible cooperation between rail and river transport. This paper is part of more wide-ranging research into the development of river-based logistics in major French conurbations in the framework of the ANR Fluide project (2010-13).

2. The different types of complementarity between railways and waterways

In the economic theory, the modal choice and the modal combinations depend primarily on the generalized cost. This value takes into account the transport costs itself, the cost generated by the possible modal transfer and the value of time which differs for each type of good. A transport combining several modes must have a lower or at least an equivalent generalized cost compared to a concurrent solution to be taken into account. Hence, the generalized cost defines relevant areas that can partially overlap other transport solutions. In the latter case, the shipper disposes on alternative opportunities. It's not the place here to discuss the advantages or disadvantages of each transport mode and their possible combinations. Concerning the multimodal transport adding barge and rail services may present the advantages of being cheaper for long and massive transport but suffer from far higher delay and relatively high break-bulk costs. Furthermore, rail presents generally a lower functional reliability on the contrary to barge services. The number of transhipments increases the risk of having technical or organizational problems especially if the final destination is not located alongside a quay or directly served by a rail terminal. As mass transport, barge and even more rail are by far less flexible than the road. So a realistic market for a train-barge solution can only occur for high volume, regular flows and distant trip (above 200 km). For our Parisian example, we identified two important good types that could be concerned by the approach as massive and regular traffics: the sea containers coming from the Havre with a final destination further than the



Ile-de-France, aggregate from the Parisian Basin and neighbouring regions. If the difficulty to combine rail and river transport is due to economic reasons, the historical situation is also playing a relevant role. The economic and technical characteristics of the two modes are fairly similar and mean they share the same areas of commercial viability. These involve large consignments (heavy and bulk freight for the agricultural sector and heavy industry and quarry products) which have more recently been joined by container shuttle services from sea ports. Consequently, there is some overlapping between the sizes of their unit loads. These are 1250 to 1400 tonnes for a full train and 1000 to 1500 tonnes for boats on the Seine, even if the range is large, extending from 380 tonnes in the case of self-propelled Freycinet barges to 4,000 tonnes for pushed barge trains. Although cost favours the waterways (0.2 cents/t.km on average compared to 0.6 cent/t.km for rail (data from Ports de Paris 2013), the catchment area for river transport is limited by its very low network density. The decision is usually to use a single mode for the main leg and the road for additional access and distribution legs if the consignee or shipper does not have a private siding or a quayside site.

This competition is long-standing. The initial symbiotic relationship which existed between about 1830 to 1860 when railway lines were built to prolong waterway networks rapidly gave way to a ferocious battle for the control of markets as the power of locomotives increased as it occurred from 1850 onwards in Europe and in America (Moulton, 1912) (Merger, 1990). In addition, their high network density provided the railway companies with a decisive advantage (Léon, 1903). In France, their monopoly within the national territory provided a basis for them to restrict or even strangle waterway transport. Only State intervention made it possible to improve the situation for the waterways, first via the Freycinet Plan of 1877, then through the 1909 Act which compelled the railway companies to connect their lines to inland ports (Dounet, 1909). The transport coordination policy that was implemented in the 1920s relied on market sharing and controlling operator pricing rather than operational continuity (Neiertz, 1999). The creation of the SNCF in 1938 barely changed the situation, and in fact even increased the pre-eminence of rail where waterways could compete. The renovation and electrification of the railway network after 1945 reinforced SNCF's dominant position at a time of constantly decreasing public interest in waterways until the creation of VNF (Voies Navigables de France) in 1991 (Le Sueur, 2004). In this conflict, the potential for transfer between waterways and rail was very marginal. For the railways, as for waterways, intermodality was a question of cooperating with road transport.

What can be a disadvantage for intermodal competition can, however, be an advantage in the case of a logistic chain where the two modes succeed each other, both with regard to the unit volumes that can be transported and complementarity between the areas covered by services. The transfer from rail to inland waterway transport or vice-versa demands effective transshipment technologies when the product is not processed during its transfer from one mode to the other. In the case of physical transshipment we have decided to consider the two most representative categories of products, containers and quarry products:

- At the sites with the greatest amount of traffic, container handling is performed with a gantry crane. Reach-stackers are used at secondary ports. These may be fitted with telescopic beams with negative reach to be able to pick up a container that is below the quay and make the transfer from the barge to the train in a single operation (as at the Dourges intermodal yard).
- In the case of dry bulk cargoes, a conveyor belt can be used for the transfer. This can be mounted on a truck and positioned underneath wagons in order to collect sand and gravel through gravity before discharging them into the barge. For transfers in the other direction, a bucket crane is used to collect the cargo and empty it into the wagons (this technique is slower and less precise than the first). In both cases physical proximity is absolutely essential. If direct transfer between the two transport vehicles is impossible additional costs are entailed.

The volumes carried by a rail or barge train are similar. This means it is fairly easy to avoid the need for an intermediate stockpiling site for bulk cargoes. In the case of containers, it may be necessary to find additional containers to make up a full load as a full rail train carries 80 containers but a barge train can carry up to 200. However, the technical interface and organizational co-ordination needs to be very good for this. When the modes are used one after the other, the cost of the transfer must of course be considered. When asked about the sums involved, VNF quoted the figure of B3 per tonne of cereals and B1 tonne for aggregates. The cost of handling a container is about B25. So, in the case of bulk materials the cost of transfer does not constitute a major obstacle to combining large volume modes. But the latter may be combined with storage (in silos, tips or stacks), repackaging, mixing or an industrial process, from all of which the firms present in the ports draw the maximum amount of profit. In the last cases the functional transfer creates a break which means that it is no longer possible



to talk about a single transport operation that takes the form of a transfer in its simplest form. From the organizational standpoint, the relationship between rail and waterways transport allows six possible forms of linkage we met in our researches (Fig.1): coexistence with a degree of cooperation, competition, succession, as an alternative mode based on technical complementarity, whose systematic presence is known as synchro-modality.

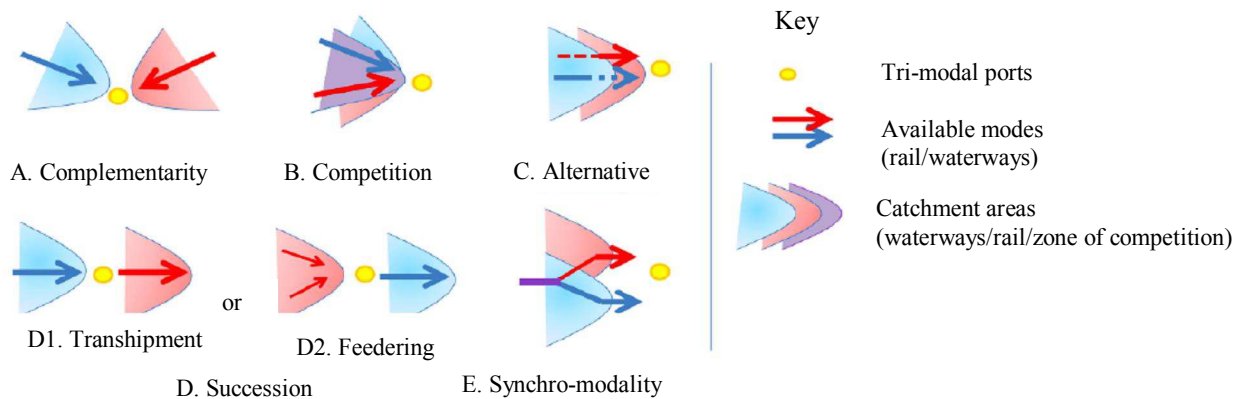


Figure 1. The different types of relationship between rail and waterways

River ports are evident point of contact and ensure that both modes will continue to be used as an *alternative* to each other (Fig. 1c) because of spatial factors (for example rail provides access to zones that cannot be reached by barge), or temporal factors (rail takes over from waterways for containers that require urgent delivery, provides an alternative when water levels are too high or too low, or following an accident). In the case of the *successive* use (Fig. 3d) of the two consolidated inland modes, the cargo is transferred from one mode to the other. We have already seen that the volumes required to fill rail or barge trains may be similar. If this is not the case, smaller flows can be consolidated or be broken up further if their distribution is required. The concept of *synchro-modality* has been introduced in the Dutch Logistic sector (Verweij, 2011), which increases the availability and robustness of services. It has been developed for traffic leaving Benelux ports for this sort of situation. TNO (2011) defines synchro-modality as *'the supply of services of the various modalities synchronized to a cohesive transport product, which meets at any moment the transport demand in term of price, punctuality, reliability and/or sustainability'* and present more an coherent alternative modal choice as a successive combination of both modes.

3. Rail connexion on the agenda of the Ports of the Greater Paris Region

Like their maritime and foreign counterparts, the river ports of the Greater Paris Region are seeking to make the provision of trimodal services a key aspect of their development (Meuriot & Meignen, 2012). Complementarity of this type, though frequently mentioned in marketing statements has barely been implemented in reality (Blum, 2010). Inland ports have primarily been interested in developing their river traffic exclusively and until now have paid little attention to rail transport for which, incidentally, they were not responsible. As most of the firms using rail had their own sidings at the port, services were often created through direct contacts between shippers and the railway sector. Until recently, even the rail tracks were the responsibility of the rail infrastructure manager. The upheavals that affected the rail market in river ports led to a reorganization of the industry that was particularly deleterious to captive traffic, and rail also failed to take much advantage of the opportunities for growth (combined continental transport and maritime containers). Technical barriers and industrial relations difficulties with regard to the organization of the work of the barge operators and railway workers have led to further reductions in traffic.

Its 12 million inhabitants and 5 million jobs mean that the metropolis of Paris generates a large volume of freight traffic (211 million tonnes in 2010) (DREIF, 2012), in order to satisfy the consumption and production needs of what is France's most important economic region. The road completely dominates the transport market, carrying 89% of the traffic, far ahead of waterways (6.7%) and rail (4.3%). The risk of congestion and environmental concerns have prompted the State, in the framework of the Grenelle environment summit, to lay down new goals for modal transfer, namely to increase the proportion of freight traffic to be carried by modes other than the road from 14% to 25% by the year 2020, i.e. an increase in traffic of 85% on the railways and 15% on the inland



waterways. These comprehensive directives are implemented in the region by the Master Plan (Schéma Directeur) and the Urban Travel Plan (Plan de Déplacement Urbain) for the Ile-de-France Region which have made modal transfer a central priority for the 'Ile-de-France Eco-region'. Several recommendations have been made. Freight capacity should be maintained, even during peak periods, on the radial railway lines that meet in Paris or on the Grande Ceinture circular railway line around the city, and all sites with railway sidings should be kept, even those in central Paris. For river transport, the idea is to support the development of new intermodal hubs in the Paris region in order to handle containers and aggregate, while retaining the port sites in the centre of the conurbation (Région IdF, 2009). A study of the links between the two modes will therefore benefit from analysis that considers the nesting of territorial scales. This will guide our analysis of complementarity between the railways and waterways from the regional scale to the changes affecting port sites. 2011 represents an important turning point in the management of port rail networks because ownership of the three principle port sites (Gennevilliers with 27.2 km of track, Bonneuil-sur-Marne with 14.3 km and Limay with 8.6 km) passed from Ports de Paris to RFF (Réseau Ferré de France, the French national railway infrastructure manager) (Ports de Paris, 2012). In addition, the Grenelle 2 Act of 12 July 2010 applied the measures that were taken in 2005 for the major maritime ports to the two autonomous river ports (Paris and Strasbourg) (RFF& PAP, 2012). The transfer represented a real challenge for Ports de Paris which had to acquire new technical and legal expertise and which took over an annual financial burden of approximately 1 million Euros in order to modernize a system that was on its last legs. While three of the ports are operating, only six of the thirty or so active sites run by Ports de Paris enjoy rail access. Ultimately, the Paris Port Authority will need to develop a comprehensive project in partnership with the two port communities which bring together the firms present at Gennevilliers and Bonneuil. The port project of creating its own rail subsidiary by 2015 to gain 50% more rail traffic (1 Mt) underlines a new interest in this perspective (Constant, 2013). Greater Paris provides us with a second useful analysis zone, which also corresponds to the area covered by Ports de Paris and the regional authority of Ile-de-France. Modal split to river transport is stable, with the waterways carrying more than 20 million tonnes in 2010. Half of this figure consisted of freight flows within the region, 74% of which were construction materials (DRIE, 2012). Container traffic on the river has been increasing steadily since its launch in 1995, and grew by 51% between 2008 and 2012 when 161,712 units were handled. Several hubs benefit from this dynamism: Gennevilliers, which has a capacity of 120,000 TEU, Bonneuil-sur-Marne (15,000 TEU), Limay (10,000 TEU) and Evry, which opened in 2010 (10,000 TEU). The trend for rail transport is much less encouraging. As we have seen, rail transport is generally speaking the weak link in logistics chains. Its share of the region's traffic fell from 14 to 10 million tonnes between 2004 and 2009 (DREIF, 2012).

The rail terminals in Ile-de-France such as La Chapelle, Noisy-le-Sec and Valenton are large by national standards and are therefore operating much below their full capacity. There are many reasons for this: the national economy has become less focused on bulk goods, rail pricing has been modified and Fret-SNCF has changed its strategies, but most important of all is the continuous reduction in freight traffic in favour of passengers. Freight slots are thus organized around passenger transport, and are therefore scheduled at night or during off-peak periods. These times do not always suit shippers and coincide with the times set aside for maintenance works. The mixed use of the network has a clear impact on freight traffic. Thus, the largest traffic capacities are to the east thanks to the Grande Ceinture. This line is entirely dedicated to freight traffic between Sartrouville and Villeneuve-Saint-Georges and connects the western network (Normandy), the northern network (Picardy, Benelux, Great Britain), the eastern network (Lorraine, Germany) and the south-eastern and south-western networks (Fig.1). To the west, a short link between Sartrouville and Achères shares the same track with the Paris-Rouen-Le Havre line and one branch of the RER A, and the southern section of track between Versailles-Chantiers and Juvisy is shared with the RER C and TGV services (as is the section between Massy and Juvisy). Only the Achères-Versailles section has been partly abandoned by passenger services. Access to this track is an advantage for nearby ports (Fig.2). It is of interest to ports to have access to a rail network which does not carry passengers as it permits a completely different train frequency which is not constrained by passenger peak periods. While Gennevilliers is some distance away, Bonneuil-sur-Marne benefits from direct access to this track. Linkage between railways and waterways is thus considered in the context of a regional logistics plan and the more distant prospect of a plan to supply 'Le Grand Paris' (which would, in particular, involve the creation of a new metropolitan port for Paris at the southern mouth of a future Seine-North canal). This would, incidentally require a rapid re-organization of urban logistics in which Paris would act as a forerunner at European level, and new dynamism at bimodal facilities that would make it possible to provide a concrete response to the issues of urban congestion.

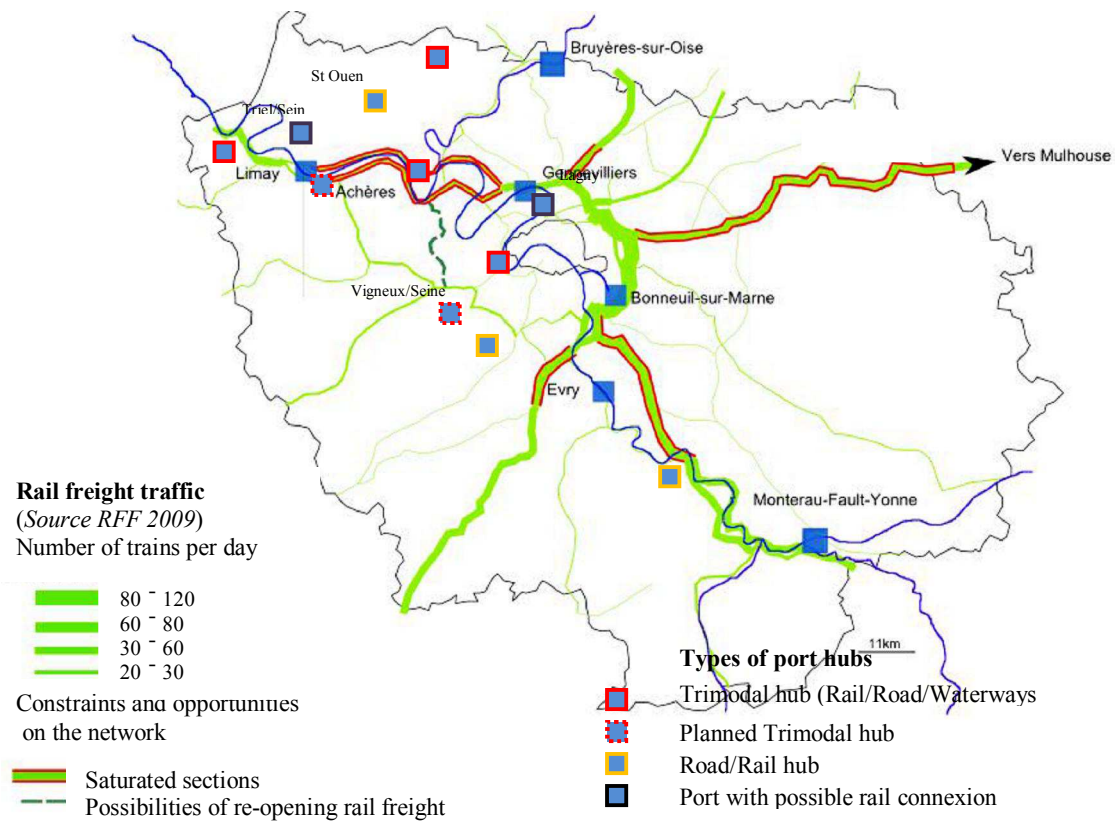


Figure 2. Rail freight traffic in Ile-de-France and location of saturated routes

Table 1. Rail traffic of the major ports in the Paris region (in t.)

Ports/Year	2010	2011	2012
Bonneuil	286079	391559	665424
Gennevilliers	747701	894673	742013
Limay	90597	134576	272335
Ports de Paris (Total)	1124377	1420808	1679772

At the scale of its hinterland, the port of Le Havre suffers from its mediocre rail access which limits modal transfer and restricts the extension of its hinterland in particular for containers. The State is currently giving priority to several projects: the construction of an intermodal hub on the GMP site at Le Havre due to be completed in 2014 with a handling capacity of 500,000 TEU, doubling the rail track between Mantes and Paris and, finally, the modernization of the Serqueux-Gisors route which provides a good quality alternative link between the maritime terminals at Le Havre and the Valenton hub in the South-East of the Paris region. Infrastructure constraints mean that the hinterland of Le Havre for containers consists of two parts each of which is geographically and modally coherent: one dense zone that extends to the south-east of the Paris region that is served by the river, and more distant destinations that are scattered throughout the area that are served by the train. The situation here corresponds to what we have called complementarity earlier in this paper. The growing integration of the Haropa Economic Interest Grouping enhances the possibilities afforded by the combination of modes for serving a maritime hinterland. On an operational level, cooperation with regard to railway services has brought the ports of Le Havre and Rouen closer together, in order to organize a joint call for tenders for the maintenance and operation of their infrastructure. They entrusted the service to Europorte by its subsidiary Socorail and Colas Rail, the same partners that were selected by Ports de Paris in 2012 to manage its port facilities (Table 1). We therefore now have the necessary information in order to conduct a re-evaluation of the complementarity between railways and waterways.



4. Combining high volume modes: the views of the major players

In-depth interviews with the major operators in the Paris region* enabled us to identify the principal markets, namely the construction sector (in particular aggregates) and container transport. These two sectors have specific geographic characteristics which can be used to identify synergies between rail and waterways which have been ignored hitherto. In the case of aggregate (sand and gravel), Paris is a major zone to be served and attracts flows. This is because most worksites and most of the demand are located around the centre of the metropolis. Most of the concrete mixing plants and stockpiling sites are located alongside waterways which encourages supply by barge. The materials they need can therefore be delivered directly without the need for intermediate points to amass or store materials. This question arises more in the case of sourcing from more distant quarries which are not near waterways. These can use two gateways on the edge of the dense urban area, Achères/Limay in the north-west and Montereau in the South-East. These provide varied supplies, brought in equally by waterway and rail, which is not hindered by competition with passenger services in these locations.

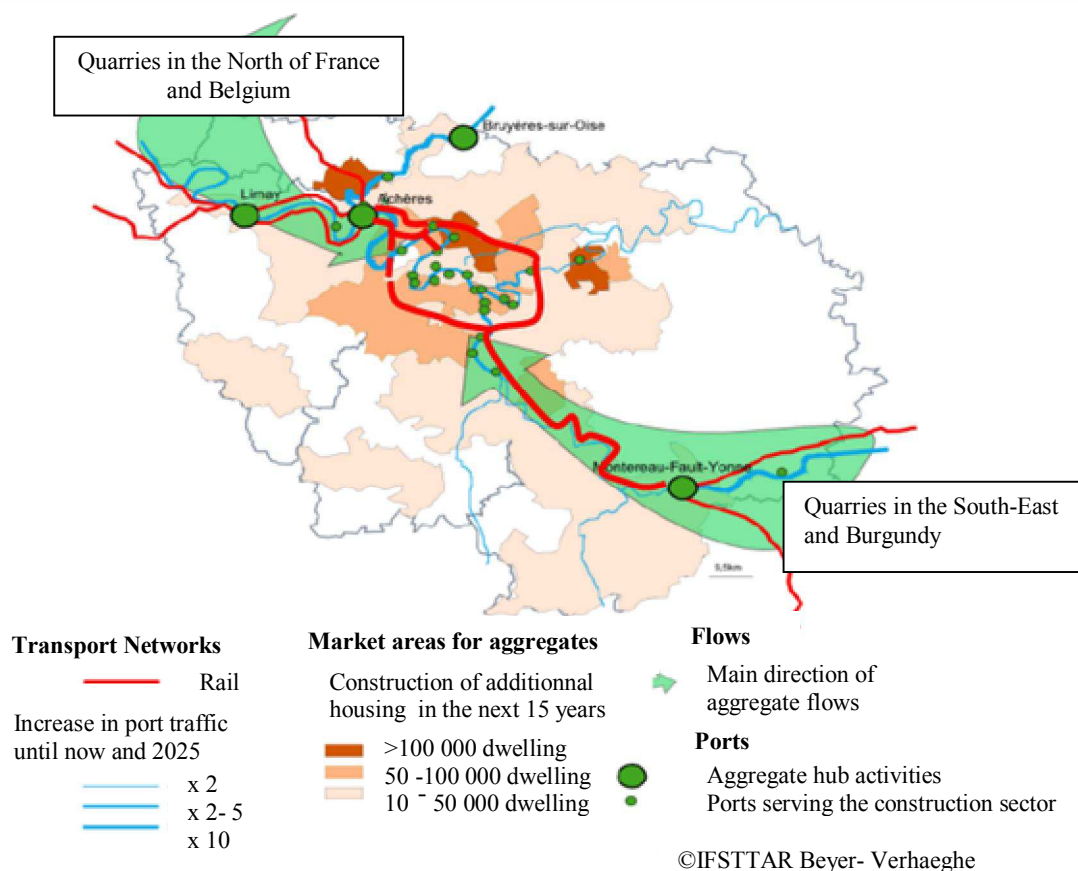


Figure 3. A regional view of the link between railways and waterways for aggregates

For containers, the dense part of the Paris conurbation is on the contrary a bottleneck (Frémont et al. 2009). This applies, for example to the container flows that originate in Le Havre and travel up the valley of the lower Seine to the logistics zones which are grouped together in the east of the Ile-de-France Region, or further on to Burgundy and the east of central France. The density of the Paris urban region impedes these flows as the railway infrastructure is saturated by passenger traffic (a situation that begins as early as Mantes la Jolie) and the Seine is impassable because of the low historic bridges of Paris. Under the pressure of the flows, a dual process can be envisaged. In the case of rail, Paris can be skirted by using the Serqueux-Gisors line which arrives at the

* Based on face-to-face interviews conducted between May and July 2013, Ports de Paris, Gennevilliers Port Community, SNCF Geodis, VNF, the Regional and Interdépartemental Infrastructure and Planning Directorate, and various shippers and forwarding agents (construction industry, containers).



Grand Ceinture at Valenton. In the case of waterways, it is possible to avoid problems due to barge size by carrying out transshipment downstream of Paris (boat/boat, or boat/train). This is the distribution hub role planners wish to assign to the future port of Achères. It will need to be designed to provide feeder services to the region's ports and serve the Paris region's market as well as possible. The barge trains leaving Le Havre will not encounter any major obstacles. Other sites will be able to perform the role of collection points for forwarding containers in transit, which is currently performed in a marginal way by Bonneuil (and perhaps Montereau in the near future). For the south-western sector, Achères could also perform this function, sending containers by rail to the Centre Region if the western part of the Grande Ceinture is reinstated or by road if it is not. But according to the current situation, no complementarity situation could be observed on the Seine River. The superimposition of the two approaches also reveals port structures which complement each other and which mirror each other upstream and downstream of the dense zone of Paris. This symmetry is also present in their position at a confluence, the Seine with the Yonne (Montereau) and the Seine with the Oise (Achères). In both cases, the presence of two multimodal port areas upstream and downstream from Paris, and Achères (30 km from the centre of Paris) and Montereau (70 km from the centre of Paris) give a foretaste of the Paris region's two major 21st century port hubs. The two sites have a considerable amount of reserve capacity and repeat, a century later, the shift away from the centre that was made possible by the ports of Gennevilliers and Bonneuil. It is also important to gauge accurately the quality and efficiency of their intermodal interconnection before initiating development.

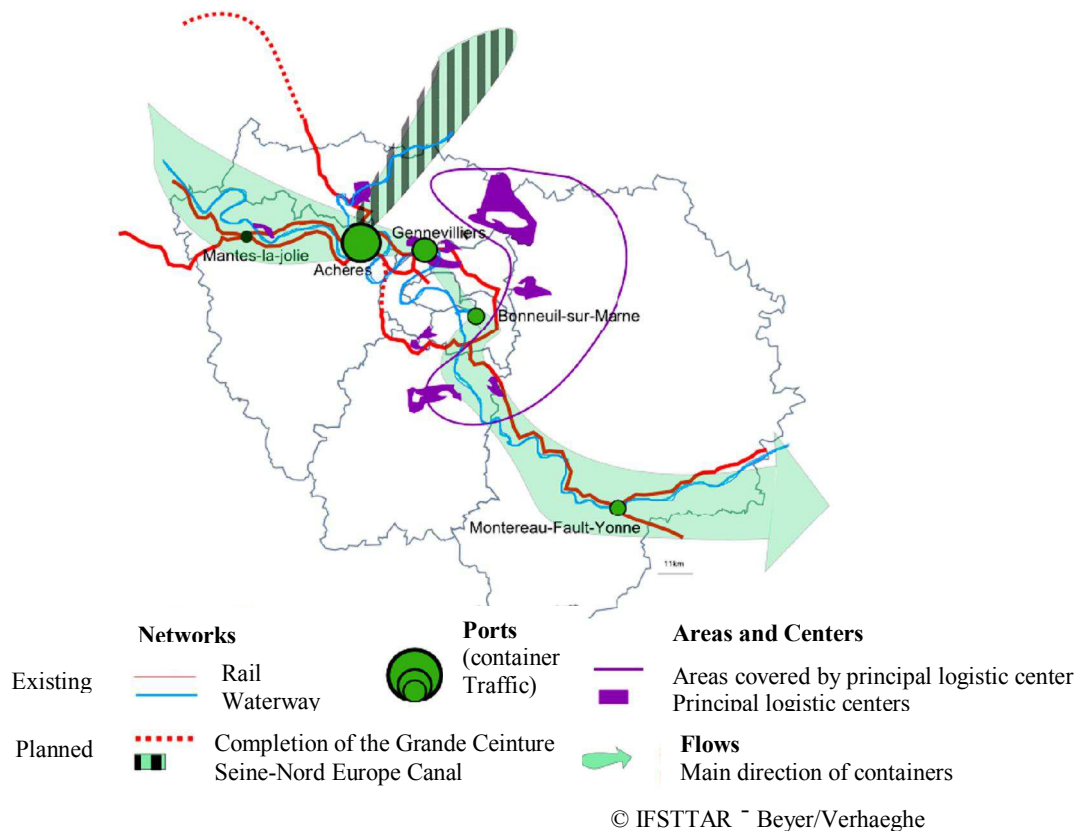


Figure 4. The linkage between railways and waterways for containers: a regional view.

5. Conclusion. Rail and waterways: new possibilities for cooperation.

In 2011, the return of the rail tracks in ports to the control of Ports de Paris was undeniably an invitation to consider possible types of complementarity between the two modes which had previously tended to oppose each other. As the principal manager of the point of contact between the two social and technical worlds, it was incumbent on the port authority to play a crucial role in facilitating intermodality. The issue of the Paris region's



ports and the potential they offer for rail transport directly raises a broader theoretical and practical question which is rarely dealt with in the French context, that of intermodality between the waterways and railways. Several combinations are possible most of them on the Rhine, but they have been implemented in an extremely unequal manner. These range from competition for markets which are frequently similar in terms of clientele and products to functional cooperation as regards the services offered by the two modes. Some factors are nevertheless essential in order for such services to develop, and the most important of these is regularity. This is one of the advantages of waterways over road transport which is becoming increasingly unreliable. It is imperative for rail to regain this advantage. The ageing of the network, the mixed nature of the traffic and high traffic loads make it more difficult to achieve this goal for routes that involve the Greater Paris Region than areas immediately adjacent to it. In the light of this, the type of cooperation between the two modes which is the easiest to envisage is one that keeps rail traffic in the outer parts of the metropolis. One factor which strikes us as important is the commercial dynamism of the railway companies which attempt to create new logistics solutions in close collaboration with their clients. The competitive dimension undeniably stimulates this niche market, but their efforts are not visible yet on the global downsizing of the sector.

Although ports are generally considered to be trimodal hubs, spatial constraints are forcing us to reconsider how they are used and develop new modal combinations. The present-day context also alters perspectives and encourages logistical innovation. This is particularly true in the case of services to dense areas of conurbations. Cooperation between the two high volume modes is not easily achieved and can only concern a few products, and it is under the special constraints imposed by the metropolis that its benefits are greatest. In the context of Greater Paris, we have above all identified one case where rail and waterways transport have started to work together: the transport of aggregate from areas that are not served by waterways to concrete mixing plants on the banks of the Seine. On the contrary to Basel or Duisburg, the organization of consolidated container transport routes from the terminals at sea ports is not working yet. In this case, barge transport provides a way of gaining access to the capital or overcoming the difficulties caused by the saturation of railway lines, but no synchronodal complementarity have raised in the current organization. Is this partial solution destined to remain a niche activity or might it be possible to build on its initial success and implement cooperation at different levels? The organization advocated by VNF in the framework of the Seine-North Europe project and the multimodal corridors proposed by the European Commission encourage this, but the economic equation is hardly favourable for a generalization even if the road price would jump significantly. The case of Paris shows that the combination of rail and barge matches for specific metropolitan markets where high spatial constraints and favourable socio-political environment are observed. In this case, the river leg of the transport chain allows to deliver the very core areas being in less direct competition with other infrastructure users. The other way round from two Rhine ports. The strategic positioning of the port administration is important whereas combining two massive modes is hardly spontaneous. Such an transport option requires several types of investments as Ports de Paris shows: planning the port as a system of interconnected and intermodal terminals, developing locally adapted infrastructures, creating a transport subsidiary devoted to regional rail services. The just-starting Parisian experience has to be capitalised and with the benefit of hindsight further research have to be undertaken to see if the technical and economic conditions are met to duplicate such modal transfer in other major river metropolises.

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