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Transport nodes: what mutual lessons between freight and passenger transport?

Agnès Sander.

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Introduction

This paper is based on research undertaken in 2000 with Philippe Revaux (Inrets). The objective was to establish an appraisal of research on earthbound transport exchange systems in order to identify findings of interest for both goods and passenger transport¹.

The vocabulary used in both fields is often the same (e.g. *hubs/hubbing*, trans-shipment, inter-modality, territorial development, rail/road dependence, pollution reduction and sustainability, etc.). And the questions raised are similar as are the problems raised by freight and passenger terminals. But paradoxically, the two fields of research seem to be insensitive to each other: the researchers are not the same, their theories differ and their bibliographies are almost completely disconnected². It is also striking that, when experts from one field refer to the other field, they often display little knowledge of it. For example, passenger transport experts are generally convinced that their field is marked by a specifically high diversity of actors and interests, that makes the design and operation of hubs difficult. And they refer to freight hub management as being simpler, because it would mainly depend on the competence and management capacity of one actor: carriers. But research on the organization of goods transport clearly shows that the diversity of actors involved is just as high and that freight hub management usually faces similar problems as passenger transport hub management!

It therefore seemed that closing the gap between these two fields of research could improve both research itself and the management practices in both fields. To meet this objective, we first sought to identify “missing issues” (subjects addressed in one field and ignored in the other). We then tried to test common hypotheses in case studies in the two sectors. We finally explored the transfer of methodologies from one sector to the other.

Our research team was formed of a freight specialist and a passenger transport specialist. The bibliography was established by each one in its own field of expertise, but analysed by the non-expert. This contributed to bringing out the implicit assumptions of each researcher at the same time as facilitating the emergence of a common language between them, despite the fact that, for reasons explained below, the bibliographies in the two fields turned out to be heterogeneous.

¹ Revaux Philippe, Sander Agnès, *Les lieux du transport : passerelles méthodologiques entre le fret et le transport de voyageurs*, Métropolis/Preditt, March 2000, 116p.

² In our survey, only two papers explicitly compare freight and passenger transport terminals. They are: PENY André, "Gares, aérogares et hangars", *Annales des Ponts et Chaussées*, n°89, 1999, p.19-25 ; and VARLET Jean, "Le rectangle d'or de Genève-Cointrin, une plate forme multi-modale voyageurs", Proceedings of the conference *Plates-formes multimodales et flux de circulation*, CIRTAI, Le Havre, 2-3 November 1989, p.69-79.

Corpus

For the field of passenger transport research, we decided to investigate the literature published since 1990. Some relevant works were published prior to this date, but most have been republished since or are out of date. We focused in particular on the outcome of research programs³ that allowed to establish states of the art of the literature, to identify major issues and priorities for future research. A number of new questions and problems relating to passenger transport facilities. We chose to centre our investigation on these rising issues (in relation to previous studies when relevant).

However, for the field of freight it proved harder to limit our literature review to the 1990s, because no states of the art were available and because a whole area of research arose in the 1980s when the question of inter-modal goods terminals became topical.

Thus the time periods retained for literature surveys were not identical in the two fields of research. Also, whereas we limited our survey on passenger transport to the academic literature, we largely referred to articles in professional journals for freight. This is not only because there were many more readily available studies of passenger hubs than of freight hubs. It is also because research on logistic platforms and hubs per se is rarely financed by public institutions or administrations, which tend to foster research on broader issues (e.g. the structure and efficiency of logistics networks). On the other hand, numerous studies have been conducted internally by platform managing firms or by engineering companies, but the results of those studies have not been disseminated because of their commercial value for their sponsors.

Analysis

These « transport places » (places of transfer or trans-shipment) have been analysed along three main dimensions:

1. As functional components of one or more networks. This raises issues of network morphology (organization of its nodes and arcs) as well as of connection, interconnection, of flows within the hub (as a contributing factor to the fluidity of the whole network).
2. As components of a territory (or territories). This raises issues of localisation, barriers, access to terminals, - structuring effects on space, spatial disruptions caused by infrastructures, environmental impact, architectural or urban integration, visibility, inter-modality and, last but not least, issues of local development.
3. As places (one could almost call them public places, even if this is less true for freight hubs than for passenger transport ones). This raises issues of building design, comfort and safety, reception of the public or customers and of staff, and integration of all kinds of related activities such as commerce, homeless people etc.

³ Programme APPORT (*Analyse prospectives des points de réseaux transport*, de la RATP et du GDR "Réseaux" du CNRS (1990) ; *Programme de recherches concertées sur la gare du Nord* (1992) ; Programme *Les lieux-mouvement de la Ville* (Plan urbain, DRAST, RATP, SNCF), 1994 et 1995 ; Programme *Gares et quartiers de gares* du Plan Urbain (1997), etc.

As this study is centred on the relationship between systems of urban places (metropolitan areas) and infrastructure hubs, we chose not to investigate the dimension of the hub as a place, even if this dimension is not entirely independent from the others (think, e.g., of shopping activities in tube stations).

Hubs as functional components of transport networks.

The literature available covers two main themes: the role of the hub in the development and shape of the network; the fluidity of circulations inside the hub as a key factor of the global performance of the network.

a. Nodes, hubs and the massification of flows.

In the field of freight, when items are light (which is more and more often the case with miniaturization) when the number of vehicles needs to be increased (to deliver goods quickly to demanding consumers or major retailers), and when stocks have to be minimized (to reduce costs) experts generally agree that the most efficient network structure is no longer a place-to-place model but a « *hub and spokes* » one. In this model (that emerged in the 1980s at a time of fierce competition between carriers) trans-shipments allow the massification of flows and thus economically sustainable increases in delivery frequencies. Hubs were thus generated by a new technical-economic context⁴. They are a key element in the genesis of logistic networks that radically differ from networks achieving direct place-to-place connections. Thus defined, the location of the hub of the network is derived from that of the places of origin and destination of flows, a bit like a centre of gravity, without any relationship - with the physical characteristics of the area to be served.

The situation is obviously very different for passenger transport, in which the private car (enabling door to door “delivery”) is the preferred mode of transport for travellers and the generally-acknowledged standard in terms of quality of service. It is therefore difficult for public carriers to be competitive in this field, if increasing frequencies means creating more transfers; this would obviously be less easily tolerated by passengers than by packages.

More generally, for freight, we noticed that trans-shipments and hubs are envisaged primarily to act on spokes/arks (to massify or rationalize flows) or on the items carried (e.g., to assemble together various parts from different origins before delivery). In passenger (land) transport, hubs and spokes are rarely explicitly organized. An exception is park-and-rides, which are viewed as a (in fact rather inefficient) means to increase the profitability of public transport by facilitating shifts from the car to the public transport⁵. Also, the massification of passenger flows clearly raises an issue of comfort...

⁴ DUPUY, Gabriel, *L'urbanisme des réseaux*, U géographie, Armand Colin, 1991, 198pp. BEYER Antoine, *Géographie des réseaux de transport : morphologies et dynamiques territoriales des services de messagerie*, PhD thesis, ENPC, 1999, 454

⁵ AUZANNET Pascal, MARGAIL Fabienne, *Planification intermodale des réseaux de transport urbain de voyageurs : une méthode de localisation optimale des lieux d'échange voiture particulière / transport collectif*, Paper presented at the 7th World Conference on Transport Research, Sydney, Australia, 16-21 juillet 1995, 15p., for passenger transport. See for freight: NIERAT Patrick, "Aire de marché des centres de transbordement rail-route : pertinence de la théorie spatiale", Paper presented at the 6th World Conference on Transport Research, Lyon, France, 1992.

In the field of passenger transport, hubs are at most viewed as a way of interconnecting lines to better serve a territory. It is a fact that hubs are very important components of public transport networks. They allow multiple links (and therefore connections to many places) from one point of entry into the network. They also allow connections between services operating on different scale (between a high speed train and a tube or a bus line, for example). This enables to serve low-density or peripheral areas in which heavy modes would not be economically sustainable. Here joint reflections on network nodes and arcs derive from reflections on the spatial performance of transport services, and are not a subject matter in its own right for network managers, as in the case of freight.

A good example of up-front questions raised in the field of passenger transport is provided in the Autrement Bus (“the bus otherwise”) project implemented by the RATP (the Paris area public transport company). In the 1980s the RATP tried to restructure its bus network in the Paris suburbs by promoting the hubs of its network. It was quite remarkable that only a few of the many objectives of this project⁶ concerned bus lines. These included the development of express lines, the implementation of a more hierarchical network structure; and the improvement of the “legibility” of the network. But these objectives did not explicitly articulate hubs and lines as is the case with measures aimed at massifying freight flows. The objective of connecting many lines together at specific places that would be kept busy by the many passengers changing lines there can be compared with the question of massification which is so central in the management of freight flows. But in the case of passenger transport, the objective of massification concerns the hub and not the line.

It thus seems it could be extremely rewarding for urban public transport companies planning to restructure their network, to investigate the interdependence between the nodes and lines of their networks, as freight carriers generally do. This doesn’t seem to be the orientation of recent policies: it is thus striking to note that in the PDU (local Urban Mobility Scheme) for the Ile de France (the Paris region), improvements to be made on bus lines are discussed in “line committees” separated from “node committees”.

b. Flows within the hub

Flows within hubs are a key factor of the global performance of the network. Any form of disruption transforms the hub into a weak point in the system. For freight flow management boils down to obtaining the highest efficiency in the circulation of items, with the help of barcodes. For passenger transport, the same concept of flow engineering (or even of fluid mechanics) dominated most of the twentieth century.. It

⁶ Those objectives included: to facilitate transfers from bus to bus or to other transport modes; to create prominent points of entry into the bus network; to build “transport places” or “mobility places”; to assert the presence of buses in Paris suburbs; to improve the image of the bus company; to integrate the public transport system within the city. See OFFNER Jean-Marc, SANDER Agnès, *Les points-clés d'Autrement Bus, des théories à la pratique. Analyse de la mise en œuvre d'une innovation à la RATP*, GDR "Réseaux" - RATP-Réseau 2000, 1990, 105 p.

is progressively being replaced by a conception based on the free circulation of passengers in public space and with an emphasis on travel information⁷.

This has major implications on the architecture and spatial organization of such places. Yet, and without going into too much detail, we wish to note that in both fields, recent applications of new communication technologies have had the strongest effect on transforming circulation. For freight, logistics are vital, not only for tracing packages or other types of data, but also because it is the most important added value to a transport operation. The integration of EDI (electronic data interchange) to the freight transport chain has had important impacts on freight hubs by transforming logistics into "advanced logistics", defined as the "synchronisation of the many institutions involved in the logistics chain and the exchange in real time of information to organizations in the production and/or physical distribution of goods, thanks to the extensive use of digital and data transmission networks"⁸. In this context, hubs are the primary places where valuable information for all the actors concerned (suppliers, clients, carriers...) is produced or gathered, processed and redispached. The hub thus becomes a strategic place in which to track goods: it is mainly when it passes through a hub that a given item can be accurately located. In the field of passenger transport, there is no question, of course, of tattooing barcodes onto passengers' foreheads. But the development of information is just as useful, even though it is less directly linked to the hub than in the case of freight. Telecommunications-related services can, in certain cases, be implanted in the hub and used to help keep passengers busy during their waiting time or to offer services along their path, so as to avoid detours or wasteful waiting. But the main use of telecommunications is providing useful information for the traveller that allows her or him to take the best advantage of the connectivity of the transport system, i.e. alternative routes, especially in the case of disruption on one line⁹. The main objective of travellers, like the clients of freight companies, is to optimise their journey. In this case information is collected everywhere on the network and the hub is only one place of access to this information, along with the mobile phone, the home or the workplace of travellers (thanks mainly to the Internet).

From In terms of transport services, recent innovations such as the « Navigo pass » in Île-de-France (an electronic pass that people will have to validate when entering and leaving the transport system and at some transfer points), will allow to "track" passengers like packages and hence to obtain new information about mobility, travel behaviours and flows in the Paris region. Freight companies have developed methodologies to analyse the massive amounts of data collected by information systems. It would be interesting for public transport companies to develop similar methodologies to be able to adapt transport services more closely to clients' needs. Information systems could also be used to improve the coordination between public transport sub-systems in an urban region. In the Paris region, the RATP (Paris public transport) and SNCF (French national railways) each broadcast joint information about the systems of the two companies on their respective web sites and telephone information services — a soft form of coordination. More significantly, information

⁷ SANDER Agnès, *Les méthodes de conception et de production des espaces de transit : un état des lieux*, Plan Construction et Architecture, Cité-Projet, GDR "Réseaux", CNRS, 1993.

⁸ OCDE, *Perspectives de la recherche en matière de routes et de transports publics*, 1993.

⁹ GILLE Laurent, LE PELTIER Valérie, *Interconnexions transport- télécommunication dans les points-de-réseaux*, RATP/Prospective, n°87, 1993, 31p. + annexes.

systems for freight management have been developed to allow the constitution of data bases shared by all actors involved, despite the initial challenge of integrating very diverse computer systems. Major public transport operators could similarly make their data bases accessible to all actors of the regional transport system (taxis, regional buses, suburban trains, , etc.): this could obviously help improve the global performance of the system.

C. Poles as components of the local territory

The relationship between networks and territory raises a variety of questions, some of which are not discussed in the literature. As we emphasized when we looked into the development of networks, hubs are not mainly characterised by their location in space. This raises further questions: Will hubs tend to attract other activities, thus evolving from being “just a hub” (a functional component of the network) towards being a pole (an urban place)? What about the sustainability such a pole if the network is subsequently restructured and the pole loses its hub function? Is it appropriate to try and locate hubs in existing urban poles to avoid a dual territorial organization (by networks and by other urban activities)? Or is it better to keep hubs away from poles to avoid bottlenecks and congestion? Finally, what can be said about the similarities or differences between passenger hubs and freight hubs in the way they articulate networks and territories (according to three main modalities: merely by allowing access to the network, by creating relations to other parts of the territory, or as key components in local urban development projects)?

We will specifically address four dimensions of the relationship between network and territory: the structuring effects of networks; the permanence or flexibility of hub locations; environmental costs; and territorial development.

a. Structuring effects of networks

The main theoretical question that arises when considering the location of exchange poles pertains to the so-called structuring effect of networks. Research into these themes¹⁰ questions the notion that hubs would systematically generate benefits to their local environment (economic development, fiscal revenue, land values, etc.) Many empirical studies, carried separately in both fields, confirm that there are no systematic structuring effects of transport hubs. Thus, if the development of new activities can be observed around some high-speed train stations, other stations produce little effect on local development and some even work as “pumps” draining activities to other areas¹¹. In the case of freight hubs, it is almost impossible to estimate the net number of jobs created (a “new” local job may only consist in a

10 PLASSARD F., 1990, "Axes autoroutiers et développement des régions", *Les cahiers scientifiques du transport*, pp.81-97 ; OFFNER, Jean-Marc, "Les 'effets structurants' du transport, mythe politique, mystification scientifique", *L'espace Géographique*, n°3/1993, pp. 233-240.

11 COLIN, 1992 ; OLLIVRO Jean, "Quand la vitesse recompose le territoire, localisation des gares TGV et armature urbaine", *Annales des Ponts*, n°89, avril 1999, p.26-31.

transfer from another place¹²). Despite much empirical evidence, the theoretical debate on structuring effects remains open¹³.

The theme of the structuring effects seemed, at the beginning of this research, quite promising in terms of potential transfers of knowledge. Because of the central importance of the economic dimension in freight transport, we expected to find many studies on the economic effects of freight hubs (or the lack of such effects) that could inform similar debates in the field of passenger transport. It turned out that available studies in both sectors did not reach clearcut conclusions. More systematic studies of freight and passenger hubs would be very useful to inform this question that has major economic and political implications.

b. Permanence or flexibility of hub location

The permanence or flexibility in the spatial location of transport hubs is also important because it materializes the degree of flexibility (or rigidity) of a network with regard to spatial dynamics (densification or sprawl of habitat, location of manufacturing and commercial zones, etc.).

The most relevant comparison on this issue is between freight and *urban* passenger transport. Many studies have shown that once a passenger transport station has been localized in one place, this location rarely changes. And this is true of even the smallest access points, bus stops. Indeed, attempts by the transport companies to restructure non-adapted bus networks are generally hampered by the impossibility to move bus stops! ¹⁴. Comparing these conclusions with similar works in the field of freight, allows to go a step further in analysing this permanence/flexibility issue. The comparison suggests that flexibility — and more generally, reactivity — represent a special effort that requires a strong motivation. Freight hubs are often basic warehouses equipped with multiple doors, that can be easily displaced whenever economic considerations require it (although this does not preclude a certain degree of rigidity in the system as a whole). Hub location is also used as a tool for flexibility. Platforms used to massify flows may disappear, if direct liaisons become more efficient/profitable.

This undoubtedly reflects a fundamental difference in the conditions of operation of the two types of networks. Public transport is generally not placed under strong economic (profitability) pressure, even if local governments, despite or because of their concern to promote public transport, keep an eye on basic economic/financial factors. Thus there are no strong incentives to seriously consider a radical restructuring of a public transport network. The question remains, whether the emerging concerns about traffic safety and environmental issues (sustainable mobility), supported by strong policies, will change this situation. Conversely, the survival of freight companies depends on their capacity to adapt their networks to

¹² DABLANC Laetitia, *La rentabilité d'un investissement en transport d'une collectivité locale : le cas des plates-formes logistiques dans le Nord-Pas-de-Calais*, Mémoire de DEA, ENPC, 1993, 78p. ; DATAR-OEST *Les centres nationaux de stockage-distribution*, 1990, p.128-129

¹³ For a review on this issue, see ZEMBRI Pierre, *Aménagement du territoire et transport : un bilan critique de la production intellectuelle des années 1990*, GDR "Réseaux"/CNRS, 1997, 114p.

¹⁴ LEGENDRE d'ANFRAY Pascale, SANDER Agnès, *points de réseaux et formes urbaines, une analyse de la correspondance entre autobus en région parisienne*, RATP, Réseau 2000, GDR Réseau, CNRS, 1993.

market or technical changes. In addition, local governments view freight as an important issue of local economic development, and are especially keen to attract freight hubs. This perception probably rests more upon the prestige associated with material symbols mobility and logistics (interestingly, some local governments seem to relate logistics to a notion — a myth? — of control power)¹⁵ than upon hypothetical benefits in terms of local development.

This suggests that a more economic approach to passenger transport could have beneficial effects by fostering a better adaptation of the structure of the network to changing urban patterns.

c. Environmental costs

In the field of freight, hub-based logistics networks are perceived by the various institutions in charge of territorial development as a way to lower environmental costs associated with goods transport (energy consumption, noise control and visual pollution etc.) by reducing truck traffic and truck-based congestion (based on a better use of lorry space and more rational routes).¹⁶ As a result, large cities in France and abroad have started to create urban delivery hubs (*centres de distribution urbaine*, CDU) to improve deliveries to town centre shops, with obvious environmental objectives. But the effectiveness of these CDU, whose benefits are restrained to town centres, is questionable as they tend to reinforce the divide between central and peripheral areas. There is also a risk of seeing increases in the cost of delivery for small independent shops cause them to disappear and be replaced by franchised shops.¹⁷ In addition, changing the location of a hub often only results in displacing environmental impacts. As argued by L. Dablanc, in terms of environmental and social costs, much depends on the scale of analysis: improvements on a regional level (related to more rational investment and the massification of flows) often mean increased problems locally (around the platform). And the same can often be said of job creations or losses.

Similar issues can be identified in the field of passenger transport. For example, park-and-rides might improve the environmental record on a regional scale (by giving

¹⁵ "Cities with efficient logistic hubs will possess the ability to control the distribution of goods" (AURBA - Agence d'urbanisme de la région bordelaise-, *Plate-forme logistique et zones de fret : éléments de réflexion stratégique pour l'agglomération bordelaise*, 1995). It is difficult to understand how such a control power could be associated with the mere existence of freight flows in local hubs unless the headquarters and plants of manufacturing firms (the potential clients of freight companies) are also located in those "cities".

¹⁶ It should be emphasized that traffic congestion is not only a problem from a local perspective, but also in terms of the global performance of the logistic system. "The points of collection and delivery of goods handled in freight hubs are dominantly located within a distance of 20 miles from this hub. On those short trips (less than an hour), the growing congestion in urban areas is a key issue in terms of global service quality" (DAUBRESSE Marc-Philippe, *Schéma national des plates-formes multimodales : réflexions et propositions pour une stratégie de localisation et d'optimisation des terminaux du transport combiné et des plates-formes multimodales de fret*, DATAR, 1997, p.27). And this congestion issue is a large-scale one: "The Roissy, Rungis and Sogaris [all in the Paris region] each generate a traffic of over 4,000 trucks per day, while at Garonor it reaches 6,500 trucks per day" (IAURIF, *Transport de fret en zone dense de la Région Ile-de-France*, 1995). This congestion generates important costs: time losses, uncertainty on trip duration, tyre and gasoline costs, and, for combined transport, the risk of getting to the station after the departure of the train (FOGLIA Laura, *Point nodal et offre de transport combiné en région Ile-de-France*, Mémoire de DEA, ENPC, 1995, p.17).

¹⁷ DABLANC Laetitia, MASSÉ Frédérique, "Les centres de distribution urbaine : un tableau comparatif", *Transports Urbains*, n°91, avril-juin 1996, p.15-21.

an incentive in favour of public transport and protecting town centres from traffic) but at the same time create new problems by concentrating traffic in the peripheral areas in which they are installed. The successful creation of park-and-rides can also create a risk for commercial activities in those areas by facilitating access to denser areas where people might rather do their shopping¹⁸.

Thus one can but wonder why local authorities (with some exceptions, though¹⁹) so often seek the installation of platforms in their territory when not only the positive effects of such infrastructures are not certain, but also their negative effects are often important: pollution, noise, congestion, segregation. In reality the criteria for planning a platform in a town are unknown. Taking into account the difficulty (in both freight and passenger transport) to evaluate public policies seeking to improve the environmental impact of transport systems by intervening on hubs and the similarity between the issues raised in the two sectors, closing the gap between these two experimental fields could but be positive.

d. Spatial planning policies

This incertitude concerning the benefits of transport hubs for local economics, when taken into account in cost-benefit analyses, sheds considerable doubt on the impact of hub-based spatial planning policies²⁰. Indeed, spatial planning, at least in France, is conceived as a decentralization policy involving the "spatial redeployment of economic activities and residential areas"²¹ thanks to "the implementation of genuine national solidarity through the harmonious distribution of the engines of economic growth"²². As a result spatial planning policy postulate a positive link between the large scale (the performance of the network at the national or European level) and the local scale (the zone close to the communications hub that is expected to enjoy economic growth). However, local and national objectives often prove to be contradictory. Not only does this conception rest upon the questionable assumption that a transport infrastructure has structuring effects (see above); it is also challenged, in freight, by the fact that companies often cannot see any advantage in locating themselves on public platforms and tend to locate elsewhere. Strangely enough, spatial planners tend to think they will be able to influence the behaviour of private firms (in terms of localisation) without taking into account their special needs! Acknowledging these needs is an essential part of any spatial planning policy. Indeed, if there is to be a better distribution of wealth, it is still necessary for French companies to be as competitive as their foreign competitors. It therefore seems counter-productive to impose locations on firms that would induce extra costs, as is often the case with public platforms. The same is true for combined transport

18 MARGAIL Fabienne, *Les parcs-relais, outils clés de politiques intermodales de déplacement urbain*, Thèse de doctorat, ENPC, 1996, p225.

19 MAS Isabelle, "Strasbourg contre les nuisances de DHL : coup d'arrêt au fret aérien", *l'Expansion*, 1996, n°533, p.90.

20 For freight, studies of spatial planning and development issues are focused on rail-road transport systems (aimed at transferring traffic from road to rail networks). For passenger transport, most studies (in France) on this subject are focused on high-speed train infrastructures, although a few studies address the impact of the closure of train stations on secondary lines (cf par exemple GREBERT Jean, *Les petites gares du périurbain en région tourangelle, continuité territoriale et rupture de charge*, Predit, 1999.).

21 GUIGOU J.-L., 1992, *22 tendances résumées pour repenser l'aménagement et l'organisation du territoire*, DATAR, 10p.

22 LIGOT M., BALLIGAND J.-P., 1990, "L'aménagement du territoire : un débat national", *Les cahiers de l'expansion régionale*, n°127, pp.1-50.

terminals that are often frowned upon by transport companies because of their low efficiency. And public platforms and combined transport terminals are at present the only known levers for logistics-based spatial planning. This leads some actors to argue that there is a "technocratic unanimity in favour of inter-modality (...) but that comes up against present practices, diverging interests between transport professionals and the internal organization of carriers»²³.

It is also necessary to take into account town councils who, on the whole, are convinced, despite theoretical and empirical studies, that the creation of a transport hub on their territory will inevitably produce benefits – especially in terms of employment – and who take many initiatives showing that their role is preponderant over that of national policies²⁴. The same is true for most European countries²⁵, engendering “disorder, improvisation, (...) wastage (...) savage competition and duplication”²⁶.

To sum up, if considering the localization of hubs as a public matter susceptible to support spatial planning policies raises few questions in the field of passenger transport, we can see that quite the opposite is the case for freight, especially as freight hubs are private and characterized by more mobility in their localisation under the constraint of economic factors. The notion of hub-based spatial planning seems appropriate in the case of passenger transport but raises many problems with freight. So it may be by dissociating these two fields that some progress could be made; planning the location of sites that basically involve private interests (as is the case for freight) is not to be envisaged in the same way as when such sites are managed by public companies or are extremely dependent on local public transport authorities (as is the case of passenger transport).

D. Conclusion

If the relationship between infrastructure and the organisation of urban or metropolitan regions is looked into, numerous themes for research are to be found, of which only a few have been identified here.

We hope to have been convincing about how interesting it can be to compare objects which are similar²⁷, but which have often been studied separately. The challenge is not only to improve our knowledge about infrastructures and territories but also to seek out and promote the best practices in the design and operation of these infrastructures.

23 AURBA, p.24. A detailed study of the problems met by carriers when they want to use combined transport facilities can be found in FOGLIA L., *Point nodal et offre de transport combiné en région Île de France*, DEA Transport, ENPC, 1994/95, 62p. See also the study by the Centre d'étude des transports pour la Méditerranée occidentale: CETMO, *Le passage du transport au stockage-distribution*, 1994, 71p.

24 BARRE Alain, MENERAULT Philippe, LOMBARD Jérôme, "Plates-formes publiques de fret et aménagement spatial dans la communauté urbaine de Lille", *RTS*, 1993, n°12, pp.3-12.

25 SAVY Michel (rapporteur), *Le rail et la route : le commerce ou la dispute ? Le transport intermodal en Europe*, Presses de l'ENPC, 1997, p.130.

26 BRUNET Roger, "L'enjeu du transport", *L'espace géographique*, n°3/1993, p.13.

27 Let us remember that in train stations, until recently, freight and passenger transport hubs were closely associated.