“Integrating 3PL in urban logistics organization”

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Integrating 3PL in urban logistics organization

Abstract

This article examines the evolution of supply networks as influenced by urban logistics, from the point of view of third party logistics (3PL) companies. 3PL are the firms which have facilitated the development of large retailers for thirty years by offering them highly complex systems of warehouses and platforms to supply stores efficiently. 3PL also initiated sophisticated logistical techniques to reduce stocks in store while controlling order picking costs. Their major strength is the achievement of significant economies of scale through resource sharing for several large retailers, resulting in ever larger warehousing infrastructures. As they developed pooling expertise early on, 3PL could acquire a prominent position in the emerging market in city logistics, in which local authorities are highly involved, a perspective that can only be considered if 3PL are able to develop a first mover advantage.

Keywords: city logistics, Europe, pooling, retailing industry, third party logistics (3PL), urban goods distribution.
JEL Classification: L81, M10, Q01, R41.

Introduction

The retailing industry has undergone numerous changes in the past few years. Convenience stores are back in force, e-commerce for consumers wishing for home deliveries is developing and contractual networks (franchises), historically very present in city centers, are constantly expanding. This development represents a break with a long-lasting trend which led mass market retailing to locate their ever larger stores on the outskirts of cities and to use extreme "massification" of supply flows (for example, truckload deliveries). New emerging models now favor "capillarity" patterns taking into account the destination of goods (small shops or consumers' homes). In a societal context of sustainable development, quality of the air and life in densely populated areas are top priorities, this produces extremely complex goods circulation issues in cities. Supply networks have hence dramatically changed in large cities giving rise to radically new questions such as: how can firms manage traffic restrictions imposed by local authorities? Will pooled logistical organizations be implemented to reduce urban infrastructure congestion? Who are the different stakeholders and who should or can deal with urban logistical issues and reorganize them? Do delivery rounds require a planning system based on new productivity measures? The works coordinated by Taniguchi and Thompson (2008) and McKinnon et al. (2010) list a number of such questions.

We wish to approach the reorganization of supply networks as influenced by urban logistics, from the point of view of third party logistics (3PL) companies. 3PL are the firms which, for thirty years, have facilitated the development of large food retailers by offering them highly complex systems of warehouses and platforms to supply stores efficiently. 3PL also initiated sophisticated logistical techniques, such as cross docking, to reduce stocks in store while controlling order picking costs (Fulconis et al., 2011). Their major strength is the achievement of significant economies of scale through resource sharing for several large retailers, resulting in ever larger warehousing infrastructures. To optimize their delivery systems, 3PL install these infrastructures at the hub of store networks to be supplied, in logistics areas far from cities so as to take advantage of the lower cost of land. Since 3PL developed spatial and managerial strategies that do not position them at any advantage when faced with the current challenges of urban logistics, will they be able to accommodate these new challenges?

The article aims at being comprehensive. It reviews a number of works conducted on 3PL and on logistics, to underline how we are now at the crossroad in terms of organization of supply networks in urban logistics. We take it as axiomatic that it is impossible to let firms implement their supply chains independently from one another particularly at the level of last mile management. The outcome would be such anarchy in the transportation of products into city center stores and/or consumers' homes that traffic would be paralyzed. To believe that a sort of "spontaneous order" might emerge from the aggregation of individual actions is wishful thinking. In fact, it becomes urgent to develop collective action reasoning to efficiently coordinate all individual actions (Stathopoulos et al., 2012). This is why the central issue from now on is to know how to initiate a pooling of activities connected with city logistics. The multiplication of urban shared-use freight terminals perfectly corresponds to this radical evolution, and it has become important to analyze which supply chain member has the expertise to best manage them.

To illustrate and understand the major issues, in the transition to low-carbon cities (Whiteman et al.,

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2011), the article is organized in three sections. In the first section, we describe the current process of resource pooling, which corresponds to an in-depth mutation in the way of considering the operation of supply chains: competing firms must learn how to share resources for a more "sustainable" behavior. What is at stake is important enough for local authorities to play an increasingly significant part in terms of urban planning, in a growing number of cities in Europe. The second part underlines the potential role that 3PL may play in the new emerging patterns, having first briefly recalled the major characteristics of the logistics industry. The central issue is to know whether 3PL, considering their former experience, may offer essential assistance to local authorities, in spite of the limitations indicated above. In the third part, we discuss the opportunities for better managing city logistics by redistributing the urban freight traffic across all times of day, and the way 3PL are here confronted with highly differentiated market segments whose requirements make it difficult to implement a single business model[1].

1. Pooling and city logistics

The mastering of logistics is a source of competitive advantage (Christopher, 2011). This explains why firms in direct competition built their supply chains in an independent, redundant and compartmentalized way. But cooperation based on the implementation of shared logistical systems can be considered as a legitimate move in given contexts, as suggested in coopetition analyses (Rusko, 2012). This is particularly true in a context of a sustainable economy, concerned about avoiding waste and limiting negative externalities associated with consuming behaviors. Pooling logistical resources has now become a societal emergency. Finally, there is nothing original in this reasoning if we adopt the *supply chain network* view, where interfaces belonging to several supply chains are identifiable, and whose efficient management leads to a pooling of resources, competences and expertise. This is quite apparent in the new urban logistics patterns driven by public pooling policies.

1.1. Pooling at the heart of major discussions. From the 1980s to the 2000s, works on logistical resources management were constantly stressing on the competitive lever that an efficient monitoring of product and information flows is for firms to satisfy consumers' demands in the best cost and service conditions (Lambert, 2008; Mangan, 2011). Developments dedicated to SCM extended the approach to a group of firms linked by "chain solidarities" (for example between a manufacturer, a large retailer and a 3PL). But they argued about the fact that competition pits supply chains against one another, forcing players to implement logistical resources to acquire an individual competitive advantage (Christopher, 2011). The most famous example is the uncoordinated multiplication of increasingly larger warehouses without any consultation between the members of a given supply chain, when these infrastructures did not operate at their maximum capacities. The outcome was a systematic duplication of investments and a waste of resources.

There is nothing really surprising here. In a liberal economy, a competitive advantage is obtained at micro-economic level (firms), even meso-economic level (firms operating inside a supply chain); the high-performance ecosystems are those showing the better medium-term survival capacity. But it should be acknowledged that this way of considering the individual performance of ecosystems, and in the case we are speaking of supply chains, poses a genuine problem: the non-optimal use of resources at collective level, the multiplication of waste due a redundancy of physical means. This leads to nuisances for involved parties across society at two levels:

1. First, the *economic level*, by preventing a mobilization of the resources used (rare and not renewable by nature) for a more efficient alternative use.
2. Second, the *environmental level*, by multiplying physical resources (warehouses, platforms), saturating urban and peri-urban areas and flows (journeys, deliveries), increasing pollution.

To face current mutations that will require a sustainable use of logistical resources, organized answers are indispensable; they extensively concern 3PL, whose expertise is actually to pool material and human resources to serve supply chain networks. 3PL are clearly at the forefront of emerging green logistics initiatives, as supply chain activities have many adverse environmental effects, particularly in the transport of goods. Among these initiatives, logistical resource pooling becomes increasingly important for decision makers, local authorities and managers. Pooling basically consists in organizing the sharing of resources between firms which may also be in direct competition in the market (Chanut and Paché, 2012). The pooling idea is not revolutionary as it finds its roots in the resort to 3PL by manufacturers and large retailers as early as the 1980s. What is new is to consider pooling as a vital collective strategy at the service of societal objectives, which has to be applied to firms' individual strate-

[1] The authors would like to express their gratitude to two anonymous reviewers of *Problems & Perspectives in Management* for their valuable comments on a preliminary draft of this article.

gies. From this point of view, we are probably at a crucial point in the evolution of supply chains, with mutations and consequences at numerous levels.

For years, there was no comprehensive vision of what was at stake in urban logistics. It can even be said that there was complete anarchy where each player was trying, without any sense of consultation, to develop his own organization of flows to deliver to his own customers even if it meant bearing negative externalities due to identical behaviors from competitors (congested infrastructures, delays in deliveries, etc.). In economics terminology, individual (and selfish) preferences of agents for a specific urban freight policy lead, when aggregating, to uncontrollable, now well-known environmental nuisances (Paglione et al., 2007). In other words, without a comprehensive or systemic vision, there is a high risk of development of significant overcapacities in logistical equipment, each firm investing in its own distribution network to develop a sustainable competitive advantage. Overcapacities will have a social cost for the community, a cost that will quickly become unbearable in the opinion of citizens concerned about their environment.

For example, to let each franchiser act freely in matters of logistics will result in a congestion of residential areas with an anarchic multiplication of delivery vehicles, not necessarily optimized as to their filling rate. The impact on the environment (CO_2, emissions, recurring traffic jams) and economic malfunctions (inability to comply with the time windows proposed to stores) would soon be unbearable for everybody. A harmonious combination of private initiatives and of public policies seems indispensable for developing a sustainable system of urban freight. In France, the Mayor of Paris is now one of the most media-successful spokesmen for this new interventionist policy. He has always insisted, since his first, then his second election, that it is urgent to greatly reduce traffic in the city, including the use of very restrictive and highly unpopular measures, like the massive reduction of parking spaces in streets to preserve the living environment of current and future generations.

Initiatives are numerous and converging today. In individual passenger transport, let us mention the generalization of the well-known "Vélib" since 2007, with 1,237 stations in May 2012 in Paris, and the launching of "Autolib" on December 1, 2011, with electric cars in self-service with direct traceability, the objective being to have 1,120 stations in 46 cities in the Greater Paris by the end of 2012. In the transport of goods, the city of Paris was the first to implement a charter of good practices in the transport and delivery of goods in Paris (see Box 1). Comparatively as dynamic actions have been in existence in London for several years (Browne et al., 2011). The experiments in Paris and London, in spite of certain differences in origins and choices in city logistics management, emphasize a high congruence of policy objectives to reduce the negative impacts of goods transportation on the environment.

Box 1. Charter of good practices in transport

A charter of good practices in goods transport and delivery in Paris was signed in 2006. It has 28 pages and is the result of four years of consultation. The charter preamble describes flows: 32 million of tons of goods arrive in Paris every year, only 1 million of which by rail and 2.5 million by waterways; 20% of vehicles are dedicated to goods transport. The charter deals with in-coming and out-going flows, and also with the downstream of supply chains, with distribution in green vehicles in the various districts. The city of Paris displays an objective of *urbanity*, i.e. of respect for the environment and the peace and quiet of inhabitants. Paris chose to do so in consultation with 47 professional and institutional partners: shippers, retailers, infrastructure managers and railroad and waterways operators (SNCF, RATP, RFF, Port Autonome de Paris), parcel delivery firms, whose representative organizations faced up to their responsibilities when committing themselves to the partnership. The institutional signatories are the city of Paris, the Conseil Régional, the Groupement des Activités de Transport et de Manutention de la Région Ile-de-France, CCIP, EDF, GDF and ADEME.

Traffic and delivery rules have been simplified to limit the traffic of the most cumbersome and polluting vehicles. Three traffic periods are identified: from 7h to 17h, only less than 29 m^3 vehicles can deliver; from 17h to 22h, only less than 29 m^3 and green vehicles can deliver; from 22h to 7h, vehicles up to 43 m^3 can deliver but have to reduce their noise pollution. Professional training for urban deliverymen/women is available to this effect. To accelerate vehicle rotation, stops in delivery areas are limited to 30 min, a period controlled with a compulsory parking disc. In addition, infrastructure managers, railroad and waterways operators and the city of Paris have committed themselves to the preservation of areas whose function is to house logistical activities inside facilities owned by them (logistical platforms and hotels). 8 sites with good transport facilities and suited to railroad transportation were selected, as well as 21 port facilities in the city of Paris itself.

Source: Adapted from http://www.paris.fr (date of access: January 27, 2012).

1.2. Local authorities' interventionism. Today, everybody obviously wishes to control the flow of products in cities by forcing firms to share logistical infrastructures for transportation and warehousing: "Urban land use planning policy can control the number and location of home delivery fulfillment facilities… and the times at which home delivery vehicles can operate at them. Planners can also decide whether there is a role for the urban authority in the development and operation of such facilities,

and whether they will be operated by one or many companies" (Browne et al., 2001, p. 34). This emerging planning has led to the creation of various urban logistical areas in several French cities: urban distribution centers, vehicle reception points, goods reception points, and even reception boxes. Despite their technical differences, all such points participate in the coherent organization of urban goods traffic based on the harmonious geographical distribution of transshipment locations.

The planning of urban logistics, necessary for functional reasons (more flexible service), environmental reasons (reduction of pollution emissions) and economic reasons (delivery and picking cost control), should ultimately result in a homogenization of the logistical performance level, since all user firms will have the same freight processing centers, at the same time, in shared urban logistical areas. Although the local authorities' interventionism in retailers' logistics that is strongly established in city centers has been confirmed in the medium term, in order to control by force firms unable to coordinate locally and to avoid the multiplication of private last mile management systems, it will be difficult for any retailer to rely on his logistical excellence considered as a specific asset to outdistance his competitors. These competitors will have direct access to the same shared expertise which will lose its capacity to make a difference between the firms benefiting from pooling. This is what seems to emerge from some current or already older experiments. This could be the cause of persisting mental blocks that some private operators display about urban logistical areas launched by local authorities?

If one adopts an open outlook on interactions between private actions and public interventionism, as suggested by Macário et al. (2008) in Table 1, one must recognize that the pooling of logistical resources fits into a project of the "sustainable city" perfectly, with concerns about how to avoid environmental saturation and pollution for lack of an adequate coordination of goods flows. Experiments and operational schemes in urban logistics planning are growing in Europe, particularly in Germany around the concept of *City Logistik* (see Box 2), and have led local authorities' to significantly increase their intervention in the management of logistical activities around urban distribution centers. Their mission is to concentrate flows on a limited number of pooling points whose operation is entrusted to 3PL if need be, then to organize shared rounds to stores. Franchise networks, based on small shops in city centers, are particularly concerned by such approaches.

Table 1. Interactions between private actions and public interventionism to solve the urban logistics problems

Types of action	Examples
Legislative and organizational action	♦ Cooperative logistical systems, encouraging night deliveries ♦ Intermediate delivery depots
Access restriction action	♦ Access restrictions according to vehicle characteristics (weight or volume) ♦ Conditioning access to pedestrian areas ♦ Urban tolls and/or periodic restrictions
Technological action	♦ Tracking and tracing systems ♦ Intelligent transport systems ♦ Adoption of vehicles adapted to urban characteristics (size and propulsion)
Infrastructural action	♦ Construction of urban distribution centres ♦ Use of urban rail for freight (freight trams) ♦ Underground freight solutions

Source: Adapted from Macário et al. (2008).

According to the conclusions of the study lead by Capgemini (2008), within the framework of the Global Commerce Initiative on tomorrow's supply chains, it is obvious that new collaboration models should be applied at the level of urban logistics. Concerning transport, the main challenges are the traffic jams and the CO_2. The pooling of delivery logistics should consequently be thought out to greatly limit the number of polluting trucks operating within the urban area. It will end with the forced agglomeration of different flows entering towns around a unique logistics system, where mass activities of goods transhipment will take place. The final solution retained will obviously depend on the category of deliveries present:

- Uniform pallets for restocking large stores;
- Mixed pallets for restocking smaller sized stores;
- Small parcels for some very small stores and home deliveries.

There is nothing surprising in that local authorities, who vouch for the well-being of the population, are at the initiative of dissuasive measures to counter problems constituted in traffic jams and pollution. The Capgemini study (2008) indicates that several towns of various sizes have adopted programs totally forbidding the access of vehicles to urban geographic areas, or submitting this access to heavy taxation. For example, in Amsterdam where 5,000 trucks enter the center of the town each day, restrictions on length and weight are applied to vehicles and delivery hours are limited. For this reason, tomorrow's supply chains will depend on optimal choices of stocking upstream and delivery downstream, in order to avoid the multiplication of superfluous handling operations, while taxes will weigh in the balance in favor of mass restocking in the urban area.

Pooling consequently leads to a public-private partnership on largely renewed bases, where regulatory constraints or a feeling of restriction must give way to an opportunity for firms: to accept the indispensable articulation of their corporate strategies with the requirements of a sustainable city, by reconsidering the structuration of the final downstream of supply chains and the management of the last mile. We agree with Bremmers et al.'s (2005) conclusions to their research on sustainable business development. The authors emphasize the quality of communication between local authorities and the industry to achieve sustainability performance objectives, as we can identify them in city logistics. According to Bremmers et al. (2005, p. 13), "creating synergy between company goals and non-commercial sustainability goals could bridge the gap between public policy and private interest, to the benefit of the environment".

Box 2. *City Logistic* in Germany

In several German cities (Nuremberg, Kassel, Koln, among others) and Swiss cities (Zurich, Basel), voluntary cooperation for a collective organization of deliveries has been developing in the past few years. Haulers, sometimes on the initiative of a Chamber of Commerce, decided to group themselves to share geographical areas of delivery in city centers, for instance. What distinguishes such initiatives from the partnerships commonly developed by French firms for the delivery of goods in cities is the cities' involvement and the haulers' advertised objective of a green city organization. German city authorities often aim at facilitating haulers' self-discipline, through the granting of quality labels for example, or even participate as shareholders in the limited company generally created to manage the service (as is the case in Nuremberg). But the firms belonging to the urban distribution center remain subjected to the city's general regulations on delivery hours or on routes for utilitarian vehicles. The purpose of such services, uneasy to achieve in practice, is to achieve full financial autonomy: it is a commercial activity which should prove profitable in the end.

Source: Adapted from http://www.transports-marchandises-en-ville.org (date of access: March 11, 2012).

2. 3PL and city logistics

The subject of the organization of urban areas was ignored by management sciences and of course by logistics and SCM for a long time. Being the business of regional development, political sciences, or very simply of town planning, it was understood that management tools were irrelevant to the case. A sharp break occurred in the 2000s, leading to a new awareness: the need for a joint planning of goods traffic in cities (Boudouin, 2006). Without such planning, numerous environmental and economic threats loom over urban areas with the risk of damaging the competitiveness of local territories. The pooling of logistical resources becomes significant as 3PL can play a major part in it.

2.1. What are 3PL? The analysis of supply chain networks currently represents a major issue in management, both for practitioners and academics. In an increasingly systematic way, the process of value creation involves various firms, which have to coordinate between them a number of logistical activities in the best conditions of cost, timeliness and customer service. This leads to the implementation of often complex monitoring procedures and a continuous interaction process to make mutual adjustments in case of problems, for instance an increase of stock-outs. 3PL have been the key players in the thorough reorganizations of supply chains for about twenty years now. Roughly speaking, a 3PL can be considered as a service provider taking charge of part or all logistical operations in the supply chain of another firm with the status of shipper. Traditionally, 3PL manage materials and/or finished goods transportation and storage activities for their customers for both the manufacturing industry and the retailing industry. To do so, they invest in a variably dense network of warehouses and platforms (Fulconis et al., 2011).

We now have to admit that logistics providers in the broad sense have acquired a growing importance in western economies, in Europe, in North America and in South-East Asia, but also more recently in Brazil, where 3PL sector becomes increasingly competitive (Wanke, 2012). For historical reasons, France is one of the most dynamic countries in the matter, together with the United Kingdom. 3PL built very large warehouses in both countries and simultaneously developed an expertise enabling them to better answer their customers' needs by offering competitive solutions for flow piloting and control. Table 2 lists the top ten 3PL in France (2010). It should be noted that the market is more or less oligopolistic as the top five 3PL hold a third of the French market.

Table 2. The top ten 3PL in the French market (2010)

3PL	Logistics turnover (M€)	Warehouse number	Storage area	Logistics workforce
Geodis	595	53	1,100,000 m²	3,500
Kuehne + Nagel	560	58	1,500,000 m²	9,000
Norbert Dentressangle	504	76	2,124,000 m²	4,835
DHL Supply Chain	400	85	1,000,000 m²	4,500
STEF-TFE	371	85	4,100,000 m³	2,935
Groupe Bolloré	360	84	506,000 m²	600
FM Logistic	291	25	961,000 m²	3,400
ID Logistics	252	39	1,136,000 m²	3,100
Wincanton	170	30	600,000 m²	1,300
Olano Services	160	16	520,000 m³	800

Source: Adapted from *Supply Chain Magazine*, May 2011.

An abundant literature has been trying in the ten last years to determine the perimeters or borders of logistical services in reference to the more or less complex operations, depending on contracts, executed by 3PL. A survey conducted in France under the auspices of the *Observatoire de la Prestation Logistique* identifies three major types of business: the first is called "*Core business*", the second "*Additional customer services*" and the third "*New professions*" (Roques and Michrafy, 2003). Table 3 describes the various components in the service offer. It shows that certain operations, such as the management of call centers or co-packing, have little in common with what is usually presented as associated with logistics. In brief, we can see an strong enlargement in the *scope* of outsourcing engagements: "Scope can be defined as the breadth or degree of responsibility assigned to the 3PL. At one extreme, outsourcing can involve assigning only one task to the 3PL from many possible tasks that comprise an entire function, such as outsourcing all truckload shipments. At another extreme, outsourcing can involve handing over the management and even strategic direction of an entire operation or process to the 3PL" (Zacharia et al., 2011, p. 43).

Table 3. 3PL service offer: three dimensions

Core business	Additional customer services	New professions
♦ Order preparation ♦ Stocking/storage ♦ Inventory management ♦ Transport	♦ After sales service ♦ Customer billing ♦ Archiving ♦ Shelf display ♦ Storage on behalf of customers	♦ Site installation ♦ Co-manufacturing ♦ Wrapping ♦ Managing a call center ♦ Co-packing ♦ Boxing ♦ Information technologies

Source: Adapted from Roques and Michrafy (2003).

The case of co-manufacturing is particularly representative of the widening of the 3PL's service offer beyond plain product shipment. An increasingly significant number of 3PL have diversified and have taken charge of co-manufacturing operations, which have gradually transformed them into "module assemblers" on behalf of supply chains. For example, French 3PL have invested in specific assets to ensure the final assembly of mobile phones and PCs in their warehouses, which as a consequence look like modular platforms in the sense that Sanchez (2007) gives them. Once assembled, finished goods are shipped to stores or home-delivered to consumers. This rising new generation of 3PL is being studied by Trentin (2011), among others. The French case is far from being atypical and isolated. Many 3PL in Northern Europe, such as Kuehne + Nagel, reason similarly and have largely extended their service offer, originally revolving around transport and warehousing, and now around the management of multiple relation interfaces with their customers.

The prevailing idea, widely shared by supply chain operation observers, is based on the fact that 3PL support manufacturers' and large retailers' realignment strategies on their core competences: the design of new products and services, communication and advertisement on powerful brands, development of original selling techniques, etc. The executing by 3PL of basic operations associated with the physical transfer of products between different geographical points corresponded at a given time with their customers' wishes to progressively free themselves from logistical activities they considered to be peripheral. The strategic vision of certain 3PL was to anticipate, then to satisfy far more sophisticated emerging expectations for services with high added value. Can current developments on green urban planning leave some space for the more dynamic 3PL?

2.2. What place for 3PL? In the past ten years, several countries have developed experiments on urban goods distribution systems, the purpose of which is product flow pooling and the optimization of rounds to stores in a given area (Quak and de Koster, 2009). The issue is now to "industrialize" them, i.e. to transform them from experiments into a global organizational model, in order to reduce the number of delivery vehicle journeys, to create possibilities of using less polluting materials and to improve the management and occupation of increasingly congested public streets. In practice, such an organization often means grouping goods for a given delivery area on a single platform. These are called urban delivery centers in the generic sense, whose function is to promote a city and its activities by replacing the multiple journeys of personal vehicles by goods flows more "professionally" managed according to an environmentally-friendly massification pattern. Indeed consumers who access shops with their own cars dramatically emit CO_2. The Capgemini study (2008) quoted above indicates that more than 60% of the total CO_2 emissions generated during the transport and stocking of one single kilo of apples coming from New Zealand, and destined for British homes, come from consumers using their cars to do their shopping. The Sephora stores in France are an excellent illustration of the stakes and benefits of pooling for the environment of towns (see Box 3).

The merit of Hesse's (2008) work is to replace current strategies in urban logistics into a historical perspective. He suggests that, with time, we evolved from cities as market places to cities as

terminals. Cities at first were perceived as an occasional meeting point between offer and demand, and Braudel (1979) emphasized the importance of fair towns in the progressive emergence of a system of exchange that led to modern capitalism. The Industrial Revolution emptied the countryside of its work force that was urgently needed by factories, leading to an urbanization process whose magnitude was so far unknown in the history of mankind. The process never stopped growing. The United Nations foresee a 61% rate of urbanization in 2030 at world scale (87% for North America, 80% for Europe). Consequently, supply networks associated with cities cannot but be radically transformed, particularly by creating logistical areas dedicated to optimized deliveries to urban markets, usually located in suburban areas (see Table 4). The exceptional density of incoming flows (products) and outgoing flows (waste) could not afford to wait for spontaneous patterns to appear, without consultation between players, at the risk of rapidly causing the asphyxia of cities.

Table 4. The city: from market place to terminal

	Function	Location	Examples
The city as a market place	Traditional place of goods (the city as a location for regional distribution)	♦ Historical urban centers ♦ Temporary use of areas for warehousing and transshipment	♦ Market places ♦ Traditional locations for urban retail ♦ Warehouses
Port cities, inland-port cities	Traditional place of goods exchange (the city as a location for long-distance distribution)	♦ Traditionally at shorelines ♦ Large inland waterways ♦ Intersections of distant trade-routes	♦ Port and port-infrastructures ♦ Storage buildings ♦ Warehouses
Rail freight terminals	Development of new transshipment points according to the industrial urbanization	♦ Main stations and their backyards, close to the urban core	♦ Rail terminals and railyards, until recently in all major cities with railway access
Wholesale, freight forwarding	Suburbanization of distribution functions out of the core city (first outward drift)	♦ Urban peripheric locations, close to highway intersections	♦ Transportation intensive land uses

Source: Adapted from Hesse (2008).

The urban distribution center archetype is an efficient solution for 3PL sharing the market of city deliveries. Most of the time, independently form one another, they do not have the quantities of products enabling them to organize their flows on the basis of optimized transport units (a full round every day for example). Besides, 3PL are faced with increasingly heavy constraints (congestion, road sharing, customers' requirements, etc.), having an influence on their decision to travel the last mile by their own means or not, with limitations imposed on vehicles occupying a lot of space at this level. Urban distribution centers are a credible alternative to such constraints; they allow 3PL to have an optimal area for unloading the goods to be sent to the area covered by the said urban distribution centers. For local authorities, property investments in urban distribution centers are a means of rationalizing goods flows in their territories, of optimizing vehicle loading and unloading and of organizing store deliveries within less busy time brackets. To design city logistics is to take into account the urban space planned and laid out to facilitate product flows without forgetting return flows. As Delaitre et al. (2009) remind us so aptly, the issue of urban logistics refers to two inextricably linked dimensions: the location of the areas involved in logistical activities and such location facilitating goods transit.

Must we suppose that it is dramatic for stores in city centers, particularly those belonging to franchise networks, forced to share the same 3PL in the end, and therefore lose a source of competitive advantage based on logistical excellence? Of course, some franchise networks developed their own concepts of logistical performance, which is "sold" to franchisees as a major competitive advantage ensuring, for example, a longer product shelf life for final customers (this is the case for the French franchisor Monceau Fleurs). Franchisors offer their franchised partners a competitive advantage based on the current *doxa* stating that the maximization of logistical service quality must be looked at through three major components:

- ♦ No late deliveries (products received within a time window);
- ♦ Delivery quality (efficient management of orders as per detailed specifications stated by the stores);
- ♦ Delivery conditions (products delivered without any damage or any packaging error).

However, we must admit that the logistical service is but one element among others in the service offer, and its significance has to be reassessed in the large retailers' business model. The other elements in the mix are just as essential (product assortment, innovation, selling price, brand image, etc.). It is not necessarily because products are delivered in time to stores that managers will systematically be accordingly satisfied. Logistical performance is in fact a minimum prerequisite, a sort of entrance barrier that firms have to bypass to hope for a good position on the market, without it being a sufficient

condition. In such conditions, urban logistics planning imposed by local authorities on firms could represent a unique chance for them. If the management of logistical activities does not appear essential for building lasting customer fidelity to a store, resources and competences should then be dedicated to other, ultimately more useful and profitable factors in the service offer.

Through the determined action and pressure of local authorities, large retailers will avoid costly investments which, in any case, are not called for to hope for a more competitive position on the market. By taking over the pooling of logistical resources dedicated to order preparation and/or final deliveries, 3PL enable local authorities to guide firms in their strategic process of focalization on other key elements of their service offer, while significantly increasing their chance of more successfully corresponding to the expectations of city center stores. There lies the interest of urban shared-use freight terminals that have multiplied over the past ten years in Europe (Regan and Golob, 2005; Marcucci and Danielis, 2008). But firms will have to accept to resort to middlemen, that they are convinced are not acting opportunistically, for example by taking advantage of information asymmetries.

In their research on the decision of logistics outsourcing, Hsiao et al. (2005) emphasize that the complexity of supply chain characteristics (the collective settings in which the logistical system operates) has a direct impact on the strategy to resort to 3PL. But the authors take care to point out that the outsourcing decision made by firms depends on transaction costs associated with the degree of uncertainty perceived in carrying out the transaction. There is nothing original here compared to Williamson's (1985) analyses, but such findings are capital in a context of city logistics. Through pooling, 3PL have expertise and a finely tuned knowledge of the operational costs that their customers will no longer incur: won't they take advantage of the situation to over-invoice logistical services with impunity? And we should not forget that pooling will produce powerful economies of scale whose amount is uneasy to assess, not to mention a fair distribution between stakeholders. 3PL have all weapons to develop opportunistic behaviors which could hinder the pooling desired by local authorities.

Box 3. Sephora and the challenge of a sustainable city

What is starting to appear in large foreign cites is going to occur sooner or later in France too: restricted access by polluting transport means to city centers. Sephora, a retailer specialized in the sale of perfume, was looking for technical solutions to this long-term issue when Deret, the 3PL Sephora had been working with for years, presented in May 2009 its project for the creation of 22 suburban platforms in France, with last-mile deliveries by electric trucks. Sephora would have to thoroughly modify their store restocking hours and their national transport plan. The decision was made at the beginning of June 2009. All suburban platforms were operational six months later. The result was very positive, with more flexibility and reactivity in case of unforeseen events, such as the heavy snow falls in France just before Christmas 2009. In the end, 1,000 tons of CO_2 were saved each year, during final journeys and the supplying of suburban platforms by truckload. For Sephora top management, everything that is delivered in city centers in small volumes, from two to four pallets, is eligible for pooling.

Source: Adapted from *Supply Chain Magazine*, March 2010.

3. Discussion

3PL involved in supply networks in urban logistics are directly threatened by other logistical operators able to manage delivery flow capillarity and take advantage of their location close to cities: haulers specialized in parcel delivery, urban passenger transport network operators, and also parking lot operators or other potential storage area operators, wholesalers specialized in catering, etc. Urban logistics involves many private or public players such as local authorities likely to enforce delivery planning in order to prevent urban congestion due to an anarchic multiplication of vehicles. The *City Logistik* experiments conducted in Germany are excellent examples of this new phenomenon. The movement has no other choice than to expand in the next few years in view of environmental care requirements in towns and cities that now must be "sustainable". It is important to determine whether 3PL, currently occupying a central position in the logistics industry in national and international flows, are well prepared to deploy sufficient and suitable resources in the management of supply networks in urban logistics.

To address this question, we examined a number of works and concrete examples underlining the issues of logistical pooling in a context of sustainable development. It was possible to compare convergences and divergences between strategies conducted in the food retailing industry and those in contractual networks (Chanut and Paché, 2012). In contractual networks, logistics is organized by franchisors to optimize deliveries to stores. Franchisors implement *vertical pooling* between their networks' members who are bound by solidarity in terms of image, marketing offer and also economic and financial performance. However, logistics in contractual networks also considers environmental issues which encourage *horizontal pooling* between distinct contractual networks that operate within the same urban area (Chanut et al., 2011). Consequently, they are

bound by solidarity in terms of logistical optimization. These preliminary investigations enable us to examine those logistical operators who developed a *first mover* advantage in urban logistics.

One of the most interesting examples is that of DHL in Germany who raised the question of how to bypass the obstacle of the last mile early on (Gouin, 2011). This 3PL soon understood that absent customers at the time of delivery, coupled with the operational complexity of scheduling round deliveries in increasingly saturated urban areas, were likely to be a major hindrance to the development of online sales. The last mile is the shortest part in the supply chain, but it is also the most expensive, up to 75% of the total logistical cost in some extreme cases, particularly when the time windows negotiated with customers are narrow. For DHL, the solution was to create unattended delivery locations at particular sites, called PackStation (see Box 4). This approach perfectly illustrates how an innovating 3PL positioned itself at the interface between a number of e-tailers and local authorities, to select the most suitable sites in function of both groups' technical and business constraints. The expertise acquired by DHL in the management of supply chain operations clearly played in favor of this innovative solution which can also be found in part in the drive technique.

However the barriers to adopt this type of innovation by the consumer himself should not be underestimated. In an extensive survey, DHL indicates that the urban consumer in Germany still mainly uses home delivery for his orders on Internet, and that this remains the preferred option for the future (see Figure 1). The automated lockerbank, such as PackStation, remains marginal, even if its use could slowly spread over the coming years (Sonnabend, 2005). Even though the potential users state that they are interested by the automated lockerbanks located on roads going to their work (for 51% of them), a problem however will arise if local authorities try to privilege mass public transport to the detriment of individual vehicles. Indeed the congestion generated by parcels delivered to automated lockerbanks proves partly incompatible with public transport, unless it is totally reorganized in associating people and products more efficiently.

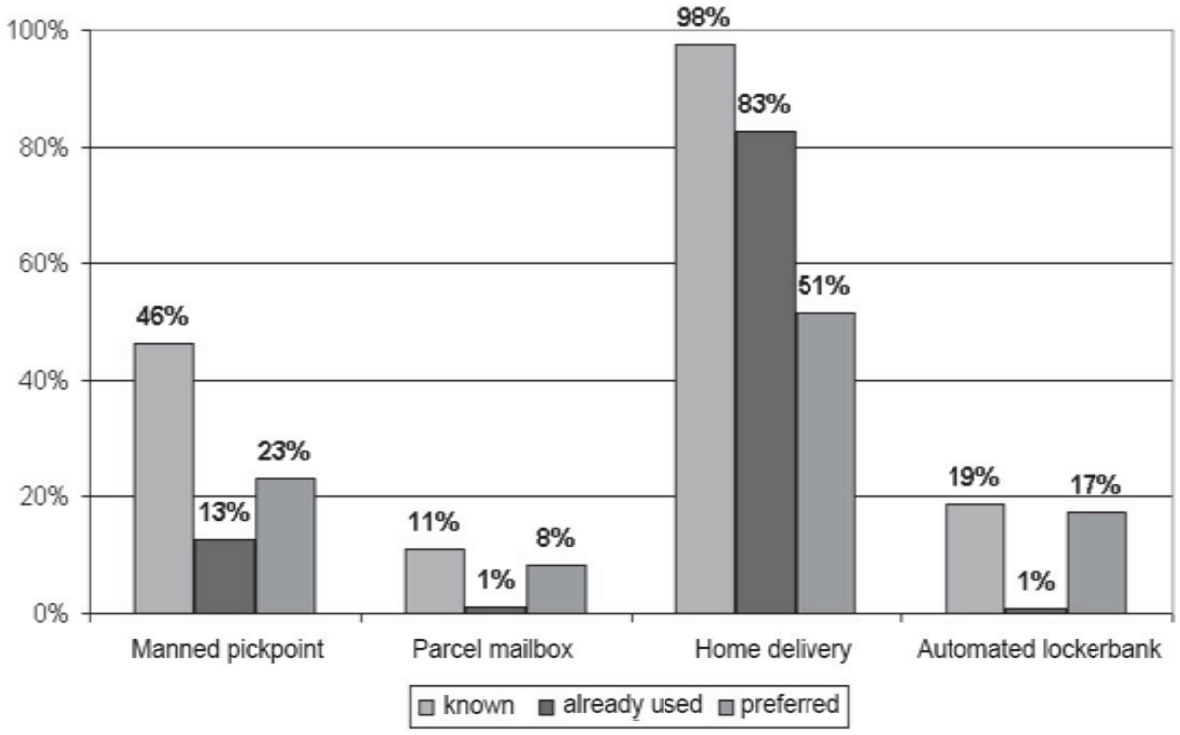

Fig. 1. Awareness and preference of delivery modes in Germany

Source: Adapted from Sonnabend (2005).

The works initiated by different academicians in the last few years are interesting in the sense that they explore both the firms' and the local authorities' point of view simultaneously. Very often, the considered options wish to be generic, suited to any urban architecture, although the expected results depend *in fine* on the specific characteristics of each town, among which their historical heritage (we know for instance that the structure of towns in France is different from the structure of towns in Germany). Following the example of the PackStation, the multiplication of experiments in several continents is a

sign of extensive developments combining public and private action reasoning. Such a mix has proved to be urgent as incidents that can disturb freight delivery in a city logistics environment come from malfunctions involving local authorities as much as firms: (1) from the clients served (delivery time changes, new customer requests, etc.); (2) from the road infrastructure and environment (road works, street markets, etc.); and (3) from the delivery vehicles (accidents, mechanical failures, etc.) (Zeimpekis, 2011).

Muñuzuri et al. (2005) listed possible initiatives for improving urban goods distribution. They show that local authorities can act both as *facilitators*, when they put logistical assets at the disposal of private firms, and as *coercive agents*, when they define space and time restrictions for access to urban areas. Couldn't they also become *coordinators* for the numerous players likely to interact in urban logistics operations? The interest of the approach lies in suggesting ways of thinking adopting the firms' point of view of course, but also combining it to the local authorities' point of view, and in highlighting the complex relation between freight transport and goods distribution in urban areas. With this in mind, it will be important to know whether strategies developed in the past by 3PL will not slow down new developments in the next few years, and how to avoid such slowing down with an adequate redeployment of their logistical resources. This probably also requires that local authorities' knowledge of and awareness in the field of urban freight transport improve in comparison with today (Lindholm, 2010).

If we accept the idea that the best way of fighting traffic congestion for city logistics is to redistribute urban freight traffic across all times of day, in order to optimize the use of road capacity (Hensher and Puckett, 2004), we must question the scope left to 3PL to use wide delivery hours. For example, the home deliveries following online orders on the Web could be restricted by e-consumers who demand their products to be delivered after 6 p.m., at the end of their day of work. The main 3PL know-how, acquired with truckload deliveries to stores in suburban areas, would be completely unsuitable, whatever their ability to manage round deliveries in urban areas, unless 3PL are able to make use of technological innovations, such as reception boxes in e-consumers' homes, where products could be left. This idea was quite popular in the 2000s in e-grocery logistics, but without outstanding results (Kämäräinen et al., 2001). Another solution for 3PL would be to simply manage collection and delivery points where e-consumers would recover the ordered products; this scenario has already be chosen by different 3PL (Durand et al., 2010).

But the issue of the pooled supply of contractual networks and of convenience stores controlled by large retailers is different: in this specific context, the smoothing of deliveries by 3PL during the day could find a relative legitimacy. The successful experiment of the Cityporto in Padua, Italy, confirms the feasibility of the option in a green city (Morana and Gonzalez-Féliu, 2011). But as Hensher and Puckett (2004) note, this means identifying the different types of players in the supply chains (shippers, government policy makers, freight forwarders, residents, etc.), as well as the elements that each stakeholder considers as essential in his decision making process, for example in terms of flow organization, stock management, JIT strategy implementation, etc. It is far from certain that each and everyone's objectives meet in terms of level of service offered to customers. Imitating DHL and its PackStation, 3PL could play the part of arbitrators capable of proposing "overall solutions" for all supply chain members. This echoes Tixier et al.'s (1983) early intuitions and confirms their convincing and lasting qualities, almost thirty years later.

City logistics leads to positioning flow inducers and flow controllers face to face (see Figure 2), when their objectives are not identical. At present, the major flow inducers, in terms of business activities, are contractual networks, e-commerce operators and more recently, large retailers developing a network of convenience stores. They obviously try to use a potential logistical competence as a competitive lever to develop their market shares, even if this results in a multiplication of individual initiatives in conflict with a sustainable view of last mile management. Flow controllers are the local authorities, who have an overall approach of environmental constraints and are able to impose policies on urban logistics collective patterns. But if local authorities gradually acquire expertise in the *design* of pooled systems, it is not certain that they have *operation* tools at their disposal. On the other hand, with time, 3PL have acquired tools and routines in manufacturers' and large retailers' flow monitoring, that they could reproduce in a context of private-public partnership. In this intermediation role, 3PL will have to make numerous mutual adjustments, on two complementary levels: the structuration of their service offer; the formalization of outsourcing contracts, in the definition of the scope of their responsibilities; and the sharing of costs and gains.

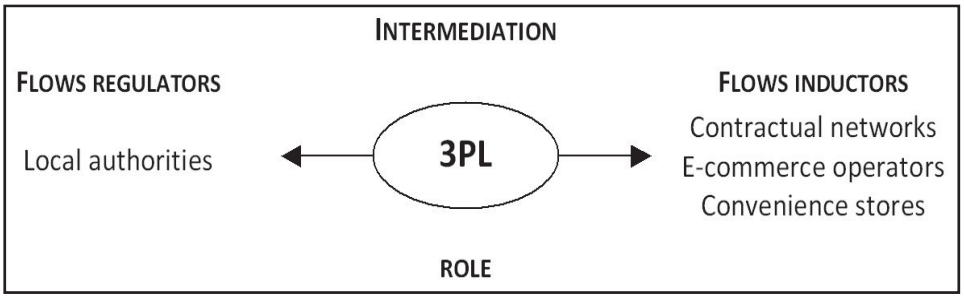

Fig. 2. City logistics: the intermediation role of 3PL

Box 4. The PackStation, between e-tailers and local authorities

About one in 15 cases of home delivery fails at the first attempt because the consignee is not at home. The DHL PackStation was designed to address this issue. It is operated by DHL, and partnerships are established with e-tailers such as QVC, Amazon, Tchibo, etc. The PackStation is an unattended delivery location at particular sites (companies, local authorities, universities, other strategic locations) for shipment in the B2C segment. The processes related to a delivery using the PackStation are the following:

1. Registration: the customer receives a PIN and a smart card for login to the PackStation.
2. Order a parcel: common practice is to order parcels from e-tailers.
3. Delivery of parcel and message to consignee: DHL delivers the parcel to the PackStation, and once the delivery is made, the consignee receives a message.
4. Go to PackStation: the consignee can pick up his parcel at his own convenience.
5. Login with PIN and smart card: the consignee has to login with his PIN and smart card to receive his parcel.
6. Collect the parcel.

Home delivery using locker boxes is an innovative approach for organizing last mile processes efficiently. Compared to traditional doorstep deliveries (parcel or grocery), the concept considers alternative delivery locations, time windows for the delivery as well as alternative redelivery strategies, if the consignee is not at home. The PackStation offers the possibility of having access to the ordered parcel 7 days a week, 24 hours a day for a broad range of products (parcels, spare parts for service technicians, online payments with credit cards, return shipment). Local authorities have been involved in the first stage to deal with permits and the choosing of sites. It takes about six months between the site selection and the first use of a PackStation. Customers do not need to pay extra money for the service and PackStation is fully financed by DHL through the savings in logistics.

Source: Adapted from http://www.osmose-os.org (date of access: April 5, 2012).

Conclusions

Recently, following the report coordinated by Brundtland (1987), the subject of sustainable development has enjoyed keen interest in Western countries and specifically in Europe. In France, Reynaud's (2010) reference works show that firms include sustainable development in their major action variables and in their corporate strategy, even if the *green washing* syndrome is not completely absent from the phenomenon. Consultations made on how to improve city logistics operation clearly belong to the mainstream of sustainable development, even if current pooling policies are also based on economic considerations on profitability (maximization of vehicle loading rate, economies of scale in warehouses, etc.). The time has come to reflect on supply networks in urban logistics in terms of concerted action, including resorting to coercion, in contrast to the past freedom that firms possessed in organizing storage and delivery rounds to stores or consumers' homes. Such freedom is no longer acceptable for environmental and economic reasons and local authorities are pressing and will go on doing so with all their might to impose pooled solutions, like shared-use freight terminals.

In reference to the experiment done in Nuremberg, Eisele (2005) sets clearly the problem of companies' reaction to restrictions that local authorities will more and more systematically develop in urban logistics: "do nothing", "bundling", "new techniques adoption", "open up". For the author, it seems obvious that the *status quo* of suicidal wait-and-see or takeover by force policies to impose a reduction of statutory constraints is not viable at term. In a perspective of respectful environmental innovation, in which individual people live, the only solutions, which should retain any attention, are bundling and new techniques adoption. They depend on the major implication of 3PL in pooling, the harmonious combination of various logistical activities (home delivery, waste disposal, etc.) the development of multimodal transfer tools and even the creation of new vehicle propulsion methods. In other words, local authorities and private companies, as large retailers, franchisors or 3PL, should be at the base of organizational and technological innovation which will enrich each other. It is at this price that we may see a true sustainable city emerge.

It would be unwise to consider that current developments in matters of urban logistics concern but a small number of supply chains, and are only a ques-

tion of practical issues connected with forced last mile optimization. It is true that many works on city logistics limit themselves to this narrow view, although it is necessary for decision making (Taniguchi and Thompson, 2008). In contrast, our article stated that the performance of supply networks in urban logistics raises the issue of whether the supply chain members have or do not have the resources and competences to succeed. A strategic and organizational approach is therefore essential, as it was essential twenty years ago, to understand and explain the expansion of 3PL in the market of the modern retailing industry (Fulconis et al., 2011). More widely, current mutations in city logistics interest academicians working on alliances, cooperations and networks. Pooling policies, imposed by local authorities, will lead competing firms to work together, and that choice will not result from a deliberate strategy from their part. Will they accept this external constraint without displaying heavy inertia, thus threatening the success of experiments under way? The discussion is open and largely conditions the future of new city logistics patterns and more widely the long journey toward a "greener world".

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