

Feeding & Fueling the City

Three scenarios to reinvent urban logistics



Octobre 2016



LA FABRIQUE DE LA CITÉ

La Fabrique de la Cité is a think tank on urban transitions, created on the initiative of the VINCI Group. From an international perspective, La Fabrique de la Cité focuses on seeing major trends and promoting pioneering initiatives by supporting exchange between various players.

As an observatory on the evolution of cities, La Fabrique de la Cité contributes to creating a shared vision between architects, urbanists, builders and residents of cities.

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weave.air is an innovation consulting firm which integrates design thinking into a business as a lever for change and value creation. Its accelerated innovation initiative, the air.LAB, which is based on collective intelligence, a user-centred approach and fast prototyping, has the goal of exploring scenarios that are right for each client and translating them into concrete terms in their organisation, culture and activities.

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INTRODUCTION

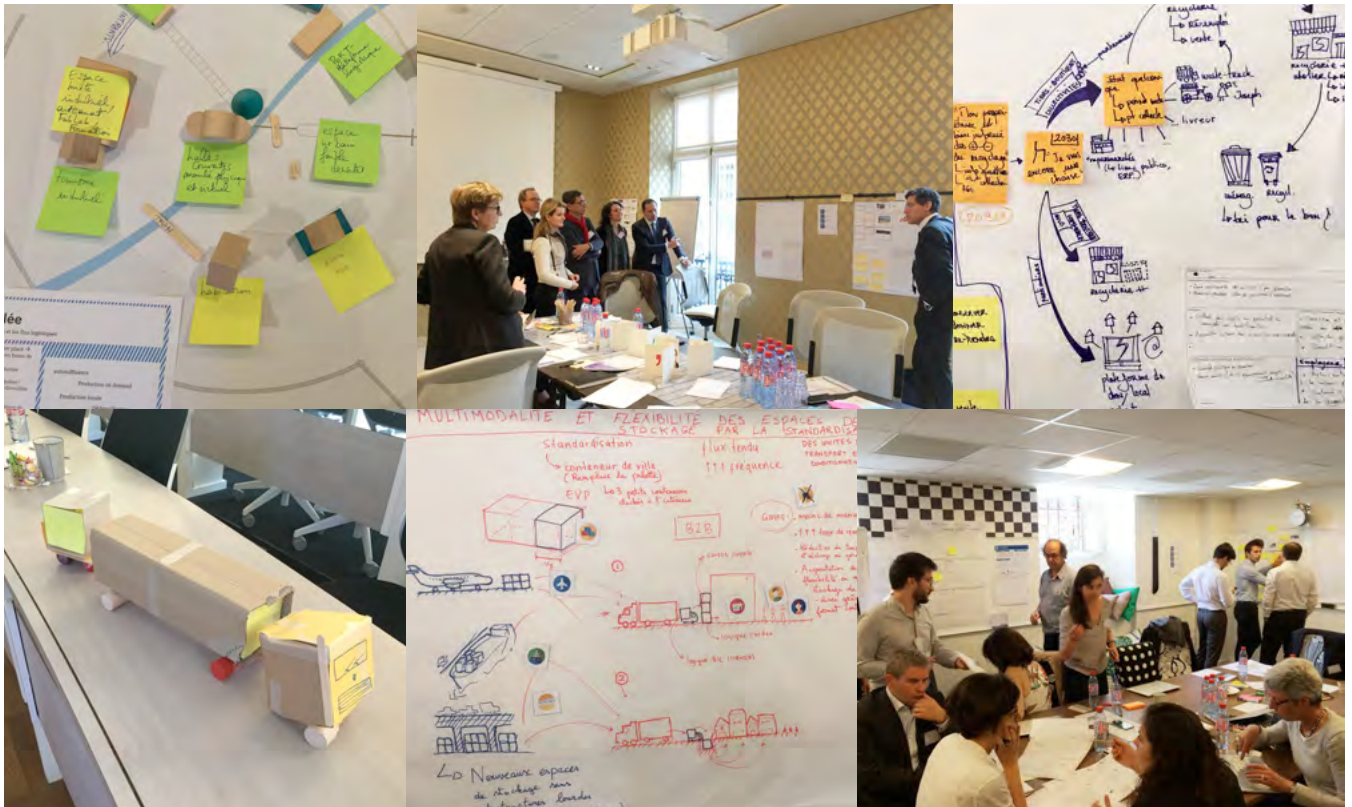
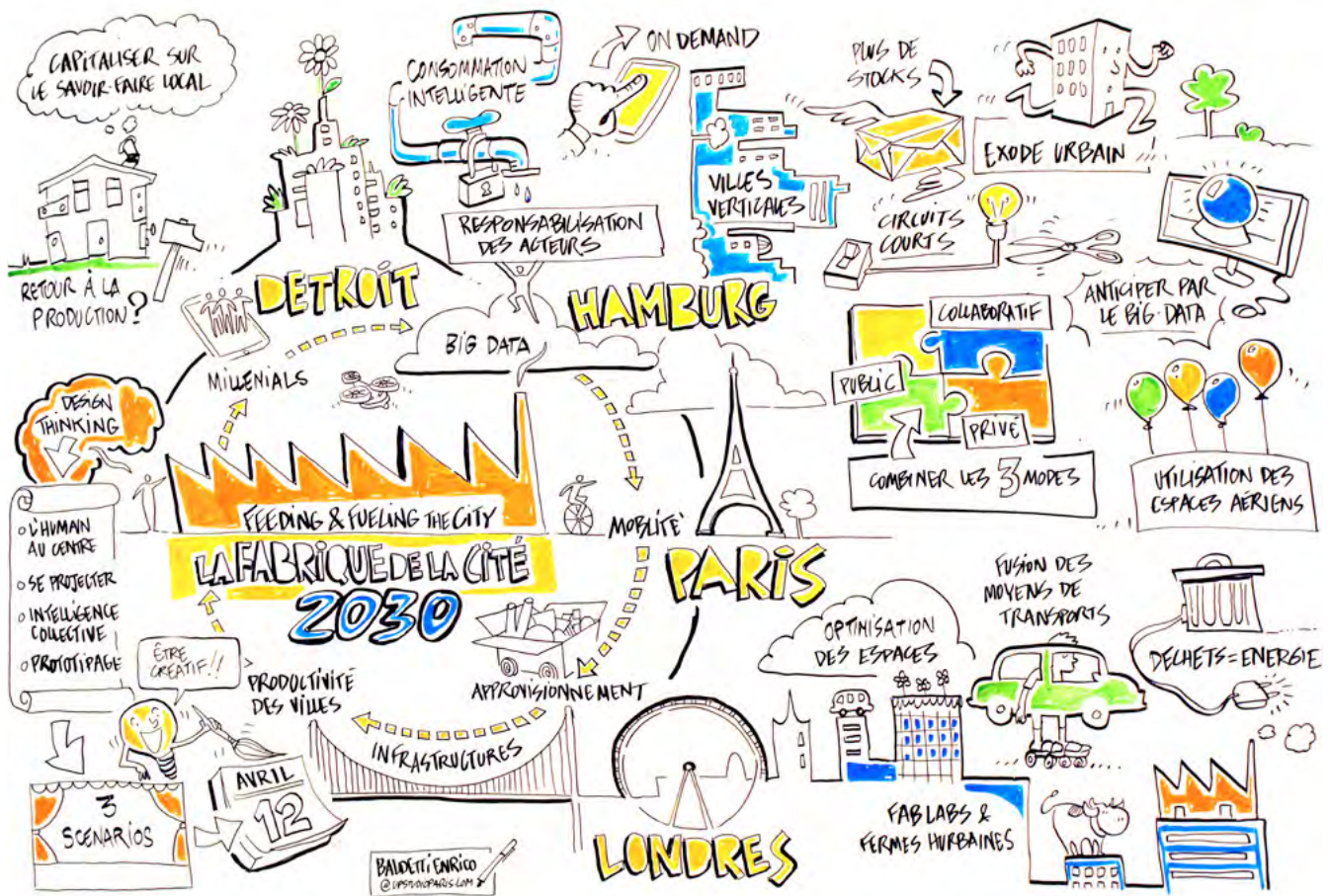


Photo credit: © weave.air

INTRODUCTION

« Feeding and Fueling the City »

How can 21st-century cities reinvent their logistics?

Three scenarios to reinvent urban logistics for the 21st-century city. An ambitious project.

For a long time, urban logistics – an issue that has been around as long as cities have – was given short shrift in public discussion and initiatives. It had generally been viewed generally viewed as a subordinate consideration or a matter of course by citizens or consumers. It had also been marginalised because the value chain to which it belongs was fragmented. The view among producers, loaders, shippers, wholesalers, infrastructure operators, distributors, and retailers was that local public decision-makers' ability to influence urban logistics was, in essence, limited or even nil. This perception grew as globalisation turned cities into increasingly important players in the world economy. There was a tacit but clear understanding that, as long as cities had secure access to goods and supplies – including food products, consumer goods, and construction materials – each link in the value chain would do what was required to achieve the final objective. Cities had refused to consider the impact of the logistics chain on people and land use, confining themselves to “enduring” the constant to-and-fro of delivery vehicles.

Over the past years, urban logistics has gradually ceased to be a blind spot in urban planning and policy. First, because its effects – including congestion, greenhouse gas emissions, and dust emissions – are incompatible with cities' aspirations with regard to environmental protection and efforts against climate change. Energy transition, social change, and broad economic transformation cannot be implemented and funded unless hidden costs are revealed and externalities gauged. Second, because city dwellers require both a high-quality living environment and wide consumer choice; in other words, they want ready access to products from around the world without compromising their quality of life. They want door-to-door service in just a few clicks. The digital revolution is also reshaping urban logistics: it is both rationalising and personalising the value chain. As a result of these contradictory trends, the situation is more complex than ever. In addition, in sectors as disparate as energy and food, a growing movement can be observed, namely, DIY. Cities aspire to produce their own goods and manufacture their own products. This desire for self-reliance and even independence is very strong, but at the moment it's not really possible to say what is achievable and what is farfetched.

So cities must take ownership of urban logistics. But how?

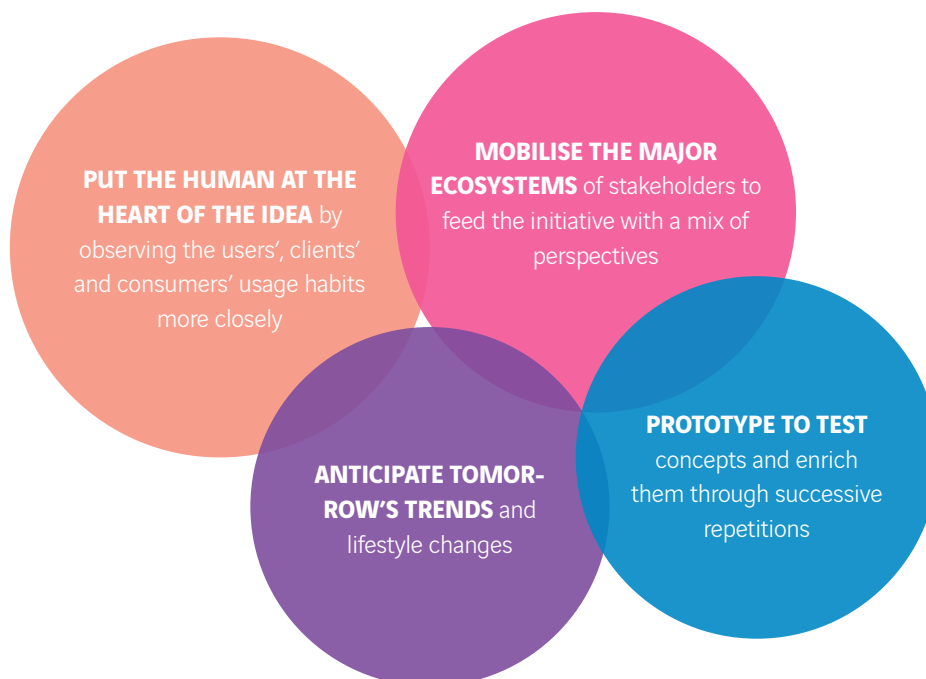
Three answers are provided here, in the form of scenarios. In the first scenario, cities would leverage their competencies in terms of road transport to take charge of their own logistics, providing guidance and even issuing requirements as appropriate. This scenario requires an unprecedented proactive approach by public bodies. Conversely, in the second scenario, cities would give economic players a free hand; this would be akin to “business as usual.” In the third and final scenario, cities would develop their production potential and break away from linear distribution and consumption patterns to embrace the circular economy. Each of these scenarios is associated with concepts leading to public and private policies and initiatives regarding trade arrangements, urban planning, infrastructure works, and the development of digital tools.

These scenarios are forward-looking – some might even say utopian – but they are based on observable trends and perceptible activities in cities in Europe and the United States. Some of these trends and activities are also presented here, along with case studies of cities that most closely reflect the scenarios outlined above.

The work carried out on this issue by La Fabrique de la Cité over the past year in partnership with weave.air, a firm specialising in design thinking and innovation, is not exhaustive – nor was it intended to be. We had had two objectives for this research project: (1) to encourage and guide discussion among players involved in urban logistics; and (2) to foster new multidisciplinary approaches to an issue that cannot be reduced to simple constructs or confined to a single category of players. That was the spirit in which we undertook this collaborative effort designed to inspire intelligent and innovative discussion. Researchers, urban planners, architects, public bodies, entrepreneurs, business leaders, consultants, participants in the social and solidarity economy – these are the players who have built these scenarios and put forward concepts in our various workshops, bringing to bear their experience, vision, and enthusiasm. We would like to thank them all for their contribution. These scenarios and concepts should provide rich food for thought and discussion in regions and cities across the world.

METHODOLOGY

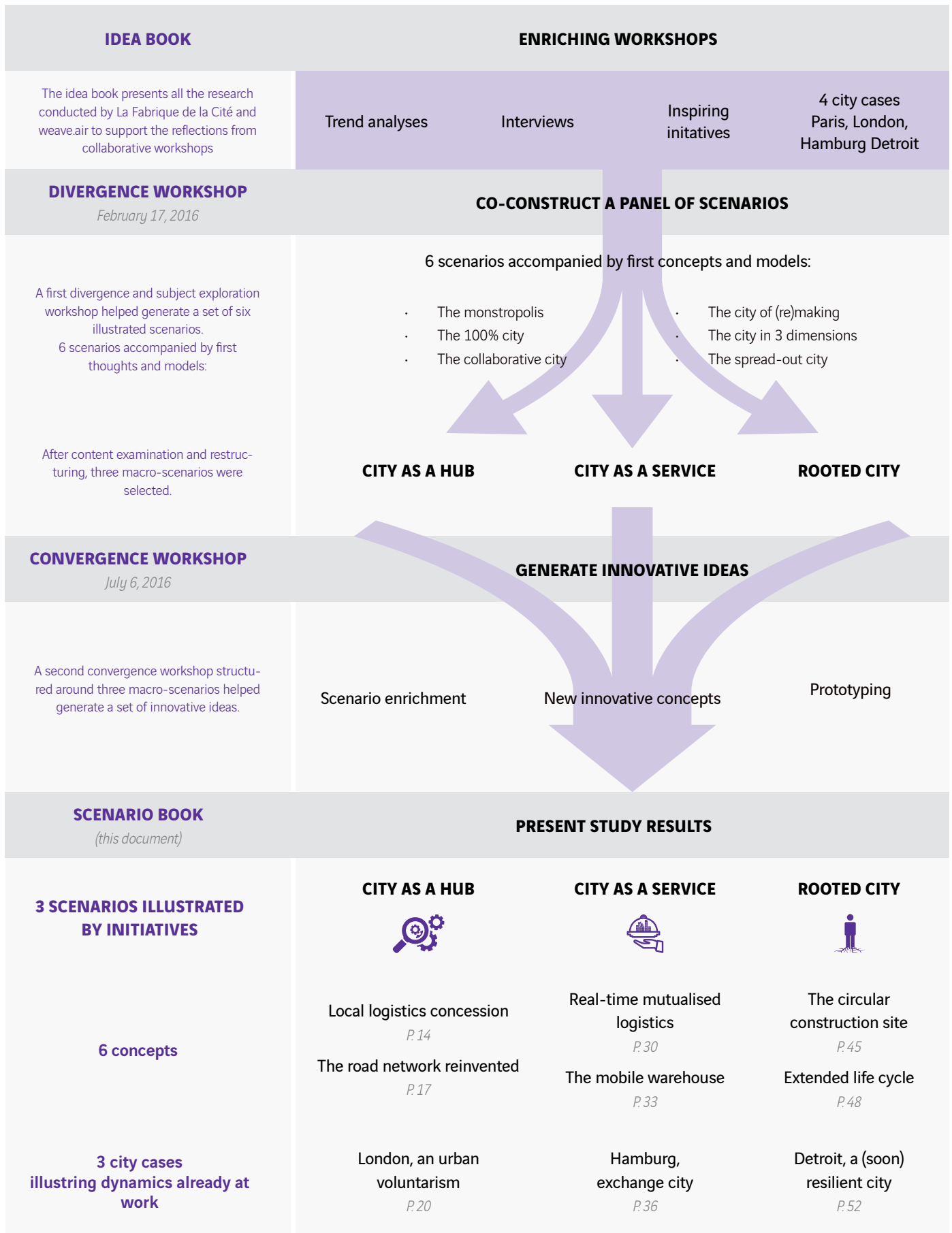
An initiative based on design thinking principles...



...organised around several high points combining expert intervention, field visits and collaborative workshops



METHODOLOGY





CITY AS A HUB



Like a logistics hub, the city fully exploits its logistics platform potential driven by the public actor creating the necessary conditions for the mobilisation of the ecosystem consisting of the city's actors.

Description

Given the numerous complex challenges that cities face, particularly where the movement of goods and people is concerned, the urban space has become a place of multiple constraints that is ever-changing and often seen as being riddled with obstacles (land scarcity, saturation, concentration of public nuisances, usage complications...). Nevertheless, a new and innovative vision of this environment reveals that it also generates multiple opportunities that cities can seize on to tackle urban logistics challenges. Besides, greater and more specific data collected by local authorities such as the actors in the logistics chain contributes to a keen understanding of the movement of people and goods and allows for further optimisations of their mobility. Finally, cities today are trying to take back control of the urban space to play a leading role in its organisation and control.

By using this input data as a base for reflection, this scenario imagines a city playing a true role as a logistics hub. So, the city rethinks itself into a special interface, a platform that fully exploits and increases the existing logistics potential. In a voluntarist approach, the public actor is the manager of this "hub" who defines its overall strategy, organises and regulates. The public actor also works to create conditions that are essential to the formation of an integrated and effective ecosystem including all the actors of the urban logistics in the territory.

With a structured and systematic data exploitation, the management of all movements is facilitated and enables the regulatory authority to optimise overall in real-time the use of the urban space.



I've built a true local logistics strategy by integrating the ecosystem of actors in the logistics into a system of incentives and regulations.

Jean-Pierre, local authority representative

I responded to a call for tenders from the city for the management and optimisation of all the movement logistics of a downtown neighbourhood.

Samir, logistician



We must meet interoperability standards defined by the city. The sharing and pooling of data from different actors is a good illustration of this.

Luis, infrastructure manager

1

REINSTALL LOGISTICS SPACES IN THE CITY CENTRE WITH HYBRID URBAN PROJECTS?

CHAPELLE INTERNATIONAL LOGISTICS HOTEL

Developed on an old SNCF railway site, the Chapelle International project aims to create a **new neighbourhood**, ideally located at the intersection of a railway junction, the Boulevard Périphérique, Boulevard Ney and motorway A1.

At the heart of the project will be a logistics hotel of approximately **40,000 m² developed by Sogaris in partnership with the Port of Paris and the Caisse des Dépôts et Consignations**, for a budget of around **€58 million**. An Urban Railway Terminal (URT) will be linked to **multimodal logistics platform** (railway-road-river) in the north of Paris, by two daily train services that can transport the equivalent of 40 conventional trailers.

Furthermore, a 10,000 m² Urban Distribution Space (UDS) will complete the project. This divisible UDS will enable different tenant messengers to **massify and optimise their movements and carry out their nearby deliveries using clean vehicles**. In addition, a reception space will allow parcels to be picked up by clients through a window and roadside access.

The logistics hotel will also host a **data centre, tertiary premises** (business incubator, professional training school, administrative offices), **shops** (restaurants) as well as **public amenities** installed by the City of Paris on the roof (sports fields and urban vegetable patches). The rest of the urban project around the logistics hotel will include housing, SOHOs (Small Office Home Offices) as well as a children's nursery.

Sogaris is building a similar logistics hotel in Brussels called the Brussels International Logistics Centre. Together with the Port of Brussels, the SEM (mixed economy business) is developing a logistics hotel that brings together premises dedicated to urban logistics (warehouses, parcel dock), premises for activities (workshops and support offices) and offices at the same site.

The logistics hotel model is representative of the need for **tighter logistics**, essential for the practice of an **eco-friendlier last kilometre logic** (green vehicles, mutualised and massified movements). This logistical tightening requires the **preservation of existing spaces** and the development of new ones with relevant structures. These projects imply the identification and redesigning of lands acquired for public purposes (new or unused) that are sufficiently large. The usage mix compensates for the low profitability of logistics real estate facilities while the integration of logistics activities helps reduce nuisances through a design adapted for infrastructures.



Photo credit: ©SAGL-Architectes Associés

Nearly 10 million square metres of SNCF real estate may be mobilised in Greater Paris.

(source : Pommellet, P. (2003) Relancer l'habitat en Île-de-France par la mobilisation des actifs fonciers publics (Revive the settlement in Greater Paris by mobilising public real estate assets), report to the Transport Ministry, October.)

The project in numbers

- 6 ha of land
- 900 housing units
- 33.000 m² of offices
- 8.000 m² of SOHOs
- 6.000 m² of public amenities
- A nearly 40,000 m² multimodal logistics hotel
- 22.000m² of public spaces

Topics for reflection

- Land recovery in dense urban zones (importance of land acquired for railway purposes)
- Hybridisation of spaces and putting "lost" spaces to good use (roofs)
- Centre-periphery connection
- Development of multimodality

2

A FLEXIBLE USE OF ROADS FOR USAGE CONFLICT MANAGEMENT

BARCELONE, COLOGNE, BORDEAUX

Rethinking the use of public space is one of the solutions envisaged to optimise urban logistics. For instance, in consultation with local transporters and merchants, Barcelona is experimenting with **seven multi-use lanes**. This experiment involves nearly **5.5 km of road and 44 parking spaces**. Through **dynamic displays**, users are informed about the permitted use of the lane at **different times of the day**. The lane is reserved for **priority bus traffic at peak hours, delivery for the rest of the day and residential parking at night**. The duration of loading and unloading is limited to **30 minutes**. This system should make traffic flow smoothly and minimise pollution, limit time on the road and the search for parking spots along these sections and reduce illegal or double parking. According to the first feedback received, **travelling time decreased by 12% to 15%**. To ensure that traffic rules are respected by avoiding high operational costs, the municipality is planning automatic systems for the detection of traffic offences.

Other traffic lane management experiences exist in Europe. Cologne is testing the concept of multi-use lanes. Bordeaux is experimenting with **Neighbourhood Delivery Spaces**, which receive several delivery vehicles for a neighbourhood or street. The cargo is then delivered to nearby businesses by bicycle.

Generally, using existing infrastructure to its maximum potential and adapting the road network for the best use are effective methods to ease congestion in city centres, reduce pollution and nuisances and allow the smooth flow of traffic. Nevertheless, this presupposes a **flexible organisation to manage usage conflict** between various mobilities in a multitude of situations (peak traffic, intense delivery period, roadworks, demonstrations, day/night, etc.).

The success of such projects depends much on the **acceptability of the system** in place (desirability, difficulty, effectiveness), the **association of all the concerned actors** (merchants, citizens, municipality), **promotion of socio-economic benefits** and the **regular monitoring** of compliance with the adopted regulations.



In Paris, at least 46% of deliveries are carried out in bothersome parking situations for all types of vehicles combined. This percentage rises to 75% for box lorries.

(source : Parisian Region (2014) Enquête Transport de marchandises en ville, méthodologie et premiers résultats (Merchandise transportation in the city survey, methodology and first results). Sustainable Urban Planning Unit – Directorate of Transport, November.)

Topics for reflection

- Mixed use of spaces
- Optimisation of the road network
- New management of the temporality of urban space use

3

DELEGATE THE LAST KILOMETRE?

CITY LOGISTICS

Launched in March 2015 in Lyon, City Logistics lets traditional couriers take charge of their deliveries for the last kilometre in the city.

The service is based first and foremost on the **mutualisation of goods**, which optimises delivery circuits and reduces the number of city rounds by guaranteeing a **maximum fill rate of delivery vehicles**. For this purpose, an Urban Distribution Centre (UDC), located in Vaulx-en-Velin on the outskirts of Lyon as well as Urban Logistics Spaces (ULS) of around 300 to 500 m², whose installation in Lyon is still in the project stage, ensure the storage, sorting and redirection of parcels grouped in batches and palettes according to their final destination.

All deliveries are carried out by a **multimodal fleet of green vehicles** adapted to the various zones served (heavy bio-NGV vehicles, electric and hydrogen utility vehicles, tricycles, etc.).

Finally, still to distinguish itself in the last kilometre, City Logistics offers several additional services to its clients: **taking charge of returns, temporary storage in ULSs, planning delivery schedules, interactive real-time information system, relay points of service and automatic Citybox instructions, etc.**

City Logistics and many other budding actors' business models in the logistics segment consist of **promoting the benefit of staying outside of the city and no longer being subject to the constraints of congestion**. These new logistics actors have strong expectations of public authorities who have the power to create structures to reintroduce logistics in the city at affordable prices and promote more eco-friendly actors (reservation of spaces, optimised delivery areas, planned schedules, electrical charging stations, integration with development projects and taxation/support of most/least polluting vehicles).

« Logistics spaces suffer from a strong financial barrier to their setup in cities because of lower profitability than housing or offices. Groups or operators such as the SNCF have a central role to play in the development of these logistics spaces because they occupy much land in the urban zone. »

Yves Guyon, City Logistics



Photo credit: © City Logistics

In some cases, 20% is the proportion of the “last logistics kilometre” in the cost of transport. It also represents 30% to 50% of the negative externalities of transport. City merchandise transportation represents 9% to 15% of vehicle movements.

(source: Raynard, C. (2012) Analysis note 274 - Pour un renouveau de la logistique urbaine (For an urban logistics renewal). Centre d'analyses stratégiques (Strategic Analyses Centre), April.

Independent distributors and small shops in big European cities represent between 30% and 40% of deliveries and receive deliveries between three and ten times a week.

(source : Dablanc, L. (2009) Freight transport, a key for the new urban economy. Transport Research, The World Bank)

Key figures

Around 330,000 movements of goods are generated each week by economic players all sectors combined in Lyon and Villeurbanne.

Topics for reflection

- Massification of delivery movements
- Reduction in the number of vehicles in the city, kilometres travelled and therefore congestion as well as noise
- Reduction of pollution with clean vehicles
- Creation of adapted storage spaces and infrastructure

4

HOW TO RETHINK THE LOGISTICS OF THE LAST KILOMETRE?

ULS BEAUGRENELLE

As part of its strategy for the development of urban centre logistics spaces, in 2013 Sogaris launched its first Urban Logistics Space (ULS) in a former carpark in the 15th Paris arrondissement. Through the partnership between Sogaris and SemPariSeine as part of the Front de Seine slab renovation programme, Sogaris was able to invest nearly €1.6 M to redesign an available surface of 3,000 m². Sogaris is leasing out this space to GeoPost (Le Groupe La Poste) based on the conditions of an agreement signed in 2012 for a period of 12 years.

With this Urban Logistics Space (ULS), La Poste can massify the flow from its Chilly-Mazarin warehouse and ensure the delivery of the last kilometre using clean vehicles.

Some **4,100 daily parcels** arrive very early in the morning in the ULS in three or four big 19 tonne lorries. The cargo is then sorted and distributed by **tricycles or electric vans**. Eventually, nearly **30 alternative utility vehicles will be pressed into service for the daily rounds**. This organisation prevents a high number vans from Chilly-Mazarin coming into Paris at peak hours.

For optimal integration into its environment, the ULS uses innovative equipment and solutions: 100% LED lighting system (office and operations), maintaining a natural source of light through the façade, built in part with glass panes, all parking spaces equipped with electric sockets, roof gardening through rain water collection, sorting and recovering waste, insulating premises...



Photo credit: © SAGL Architectes Associés

The project in numbers

- Surface area: 3,000 m²
- 4,100 parcels/day
- 30 alternative utility vehicles
- 50% reduction in the number of kilometers travelled
- 30% reduction of carbon emissions

Topics for reflection

- Land recovery in dense urban zones
- Hybridisation of “classic” urban spaces with logistics spaces
- Massification of inbound traffic flow

LOCAL LOGISTICS CONCESSION

Presentation

The concept of a local logistics concession responds to a **regulated and oligopolistic vision** based on a fiscal system of incentives. Wanting to reappropriate urban space management, **local communities have regained control creating a territorial logistics strategy**. As of now, they will be responsible for organising logistics movements and building around them an ecosystem of logistics actors with well-defined specifications: **enhancing the urban dweller's lifestyle, guaranteeing smooth service for the consumer and developing neighbourhood economic activity**.

At district level, neighbourhoods or cities, public service logistics concessions are **indispensable links in urban logistics**. These are put out to tender by the city and awarded to actors meeting a certain number of criteria: carbon dioxide or nitrogen oxide level per parcel, maximum traffic flow, etc. These concession holders are designated as being **solely responsible for logistics organisation at their local level**. Respecting variable terms for delegation, they ensure the **optimisation of traffic flow and deliveries in the last kilometre** of their area: planning schedules, setting rates, defining mutualisation conditions, optimising fill rates and delivery routes, providing dynamic management of delivery areas, offering rate incentives for alternative vehicles, etc.

Most of them rely on an application for logisticians and end-users to locate and receive parcels, identify available delivery spaces or manage the goods and merchandise package pickup process.

Consolidation centres serve as necessary gateways in the logistics concession zone, thereby marking the limits of the exclusion and inclusion zones. These consolidation centres **receive all the goods and parcels from outside** which must be delivered in the neighbourhood or city. On the periphery of the exclusive zone, **the local authorities have put in place a set of urban facilities** to install local distribution, loading and pickups, that is, package collection. Some of these operations are managed directly by concession holders or operator delegates as some municipalities have created lots. These zones are also equipped with **a tight network of infrastructures** to receive clean vehicles, such as electric charging stations.

To take into account probable side effects and limit the emergence of independent operators who participate in the system without respecting all the rules (freeriders), a system has been developed for peer-to-peer logistics regulation.

Key figures

50%

The transportation of merchandise for private or professional use represents nearly 1/3 of carbon emissions in urban zones and 50% of fine particles released into the air.¹

15%

City merchandise transportation represents 9% to 15% of vehicle movements.¹

¹ Raynard, C. (2012) Analysis note 274 - Pour un renouveau de la logistique urbaine (For urban logistics renewal). Centre d'analyses stratégiques (Strategic Analyses Centre), April.

CONCEPT



hub



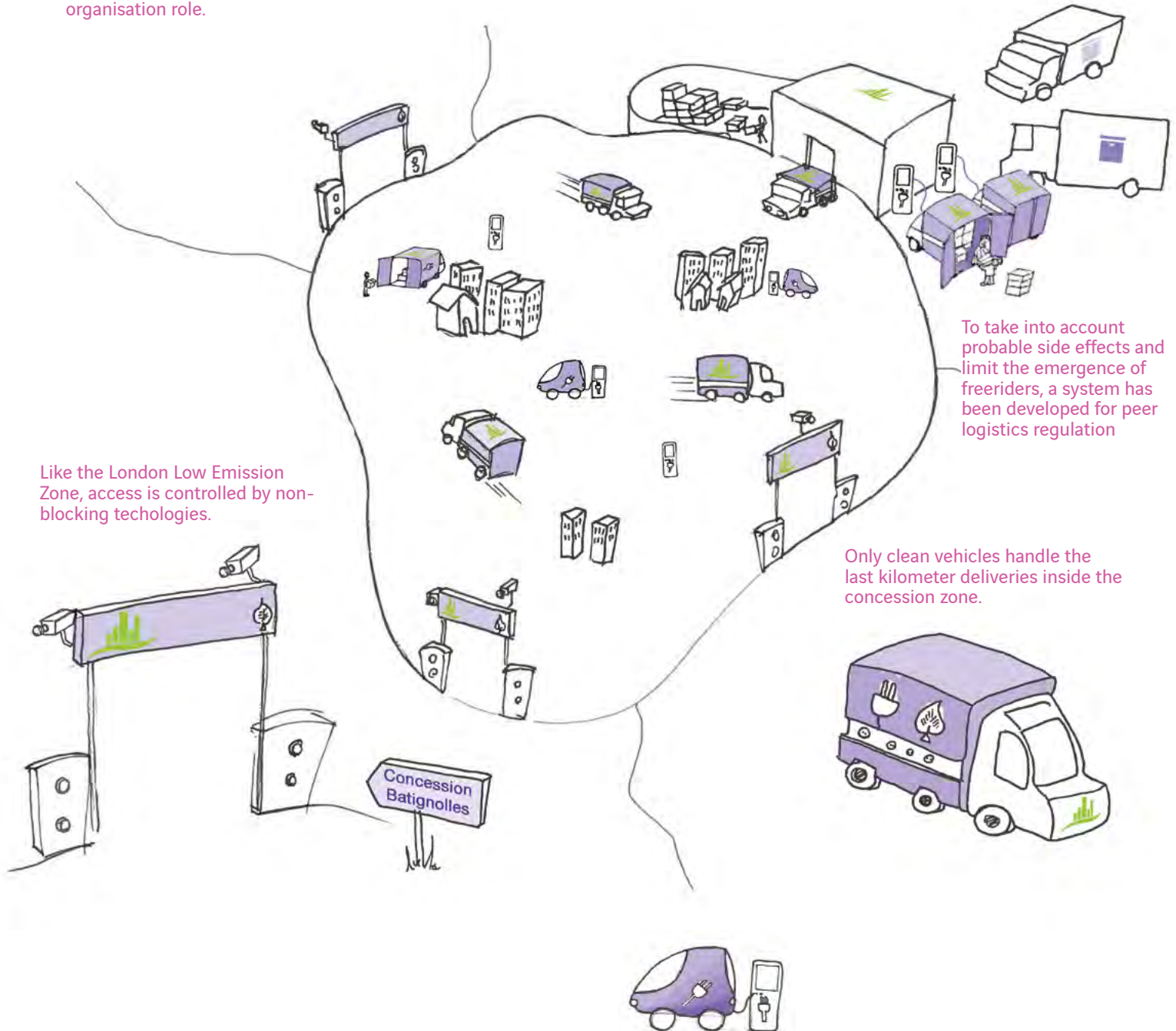
By charging stations, local logistics hubs, collection of used packaging, local authorities assume their organisation role.

The consolidation centre constitutes the last point in the logistics chain for traditional traders.

To take into account probable side effects and limit the emergence of freeriders, a system has been developed for peer logistics regulation

Like the London Low Emission Zone, access is controlled by non-blocking technologies.

Only clean vehicles handle the last kilometer deliveries inside the concession zone.



Conditions for implementation

The constraining nature of this tool requires a strong political and administrative commitment on the part of local authorities. In fact, logistics concession implies a disruption of the economic equilibria, a certain competition mayhem, as well as edge effects that could entail significant reticence on the part of transporters, loaders, or retail traders. Hence, it is essential that transition toward this new system be supported by a clear political vision and a coherent administrative infrastructure. Furthermore, each concession should make the object of a preliminary reflexion in order to define the proper organisation and regulation concerning the flow of goods within an

established space, taking into account the specificities of each neighbourhood, and even every street.

Moreover, the proper functioning of the concession demands that property logistics close to granted areas be recovered and developed so as to allow the organisation of operations within every perimeter.

Finally, the road network ought to be adapted to the new good flow. In this sense, relevant examples of road network adjustment comprise revising the parking management, arranging temporary storage spaces, or using mixed traffic lanes.

In what way is it innovative?

A concession allows to deeply rethink urban flows by associating the global vision of public actors to local, long-term optimisation. The dynamic management of parking and its related pricing challenge the current functioning mechanism that is rigid and hardly optimal (for example, dedicated delivery slots are used only 10% of the time). A generous fiscal regime supports a peer-to-peer delivery logic instead of less virtuous options.

Value-sharing is reorganised. Concessionaries are paid directly by the service beneficiaries (loaders, transporters,

retail traders, or citizens, depending on the situation). The integrated approach of the flow management paves the way for optimising and augmenting activities such as collecting waste and packaging, or reverse logistics (merchandise return).

Finally, the concession may allow to unite actors and to bring new stakeholders to the discussion table, for instance planners, developers, circular economy actors, automobile manufacturers, concession specialists, or energy engineers.

Going further...

- Is logistics concession merely a place or a real service? Would the final target be the achievement of fully electric platforms or the development of local logistic?
- How can a circular mechanism be integrated in this system (packaging and waste returns)?
- What type of consumer service should be developed?
- How should edge effects be integrated and territorial disparities limited?

THE ROAD NETWORK REINVENTED

Presentation

Assigning new functions to the road network so that it can manage various uses and types of movements with flexibility is the idea behind the concept of a reinvented road network.

In the urban zone, depending on the time of the day, traffic intensity or specific events, the road network adapts itself dynamically through a solar-powered display mechanism, for instance, by allowing road markings to be switched on and off, expanded and shrunk. Traffic, parking, delivery, hauling operations: spaces made available on the road network are completely mixed to receive different types of traffic flow, whatever their function may be. In some cases, eliminating kerbs facilitated the enlargement of the field of application of this mixed use road network by adding to it spaces dedicated to pedestrian traffic. Such a system depends on a series of sensors (position, movement, parking, etc.) integrated directly into the road network and/or the vehicle, with data being then centralised and used for the management of the thoroughfare in real time, as well as for the dynamic pricing of the service. In fact, the cost of occupying a space on the road network varies according to the time of the day depending on many variables: supply, demand, parking period, usage type, vehicle type, etc.

This concept of a reinvented road network also calls for the road network to be understood three-dimensionally. In the peri-urban zone, light infrastructures are built on the sides and under or above motorways through the construction of tunnels or viaducts, for example, which enable the passage of autonomous rolling drones carrying small parcels less than 80 cm. The drones have dedicated lanes here, but at the end of their route, they merge directly with normal traffic. In this way, these infrastructures ensure the development of a new form of invisible and automated logistics. A dedicated application helps intercept parcels that are being routed or redirected to another address if necessary. Final recipients receive their delivery at a space temporarily assigned on the road network by using their application and a release code given to them earlier.

Key figures

86%

Drones work only for clients who live within a 16 km radius of warehouses and can handle parcels weighing upto 2.3 kg, which is around 86% of parcels delivered by Amazon.¹

30%

is the average road occupancy rate by urban freight.²

10,000

daily loading and unloading in Barcelona requires nearly 4,000 delivery spaces in the road network.³

1_ Melia, S. (2015) *Les laboratoires de la nouvelle logistique urbaine (New Urban Logistics Laboratories)*, *Le Nouvel Economiste*, 24 Septembre 2015

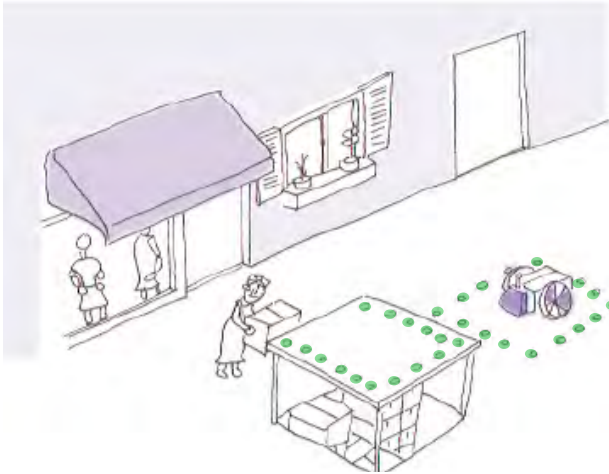
2_ Raynard, C. (2012) *Analysis note 274 - Pour un renouveau de la logistique urbaine (For urban logistics renewal)*, *Centre d'analyses stratégiques (Strategic Analyses Centre)*, April.

3_ Forkert, S. and Eichhorn, C. (2006) *Policy note - Space management for urban delivery. Niches transport*.

CONCEPT



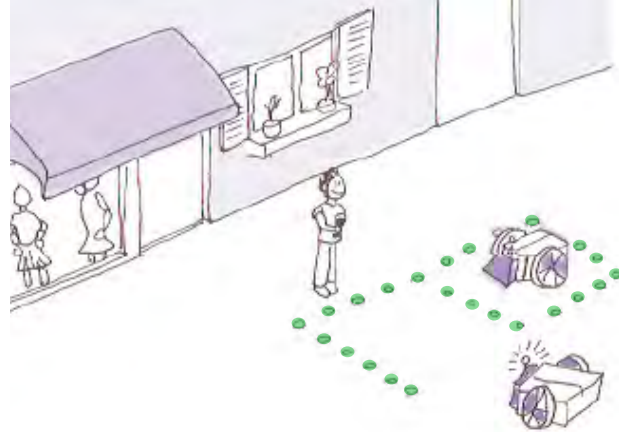
11 AM



The road network has storage spaces for shops powered by drones.



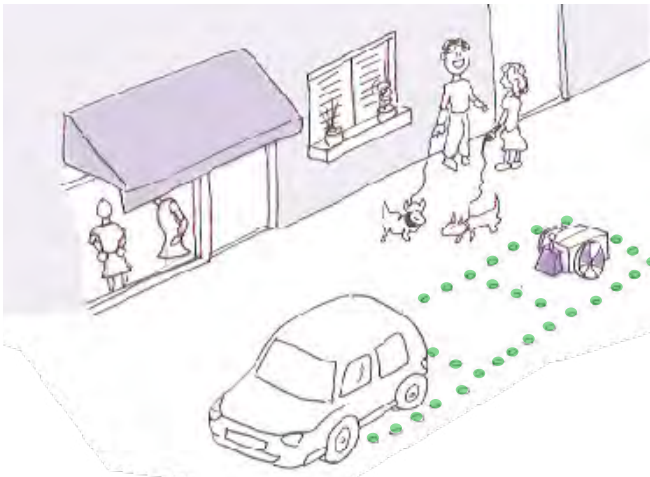
4 PM



Recipients pick up their parcel on the road network and delivery and release are guided by an application.



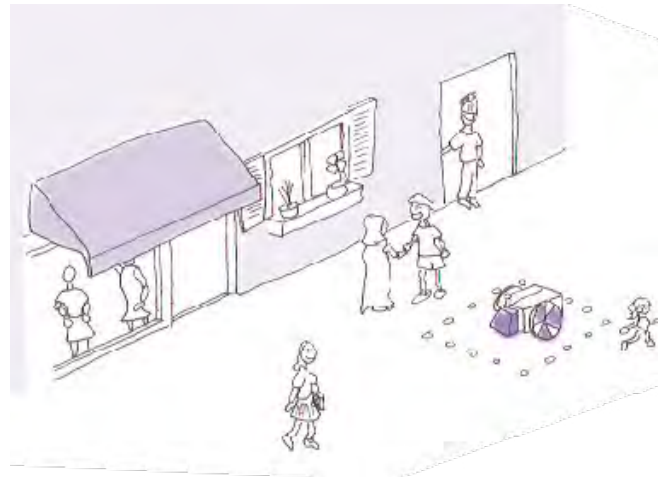
10 PM



Depending on the context (schedules, logistics needs, traffic...), the road network is shared by different users.



SUNDAY



Florence has not picked up her parcel at the scheduled time and space on the road has been occupied the whole day, so an additional cost will be applied to her delivery.

Conditions for implementation

In keeping with the framework of the scenario, this new road network concept requires a strong intervention from the public authority to ensure coordinated traffic management and parking as well as to set restrictive usage fees. The assessment of externalities from different uses is by nature subjective and requires prior reflection

and a clear stand from the community.

Autonomous rolling drone traffic on public roads, like driverless vehicles in general, should also be organised according to adapted traffic regulations.

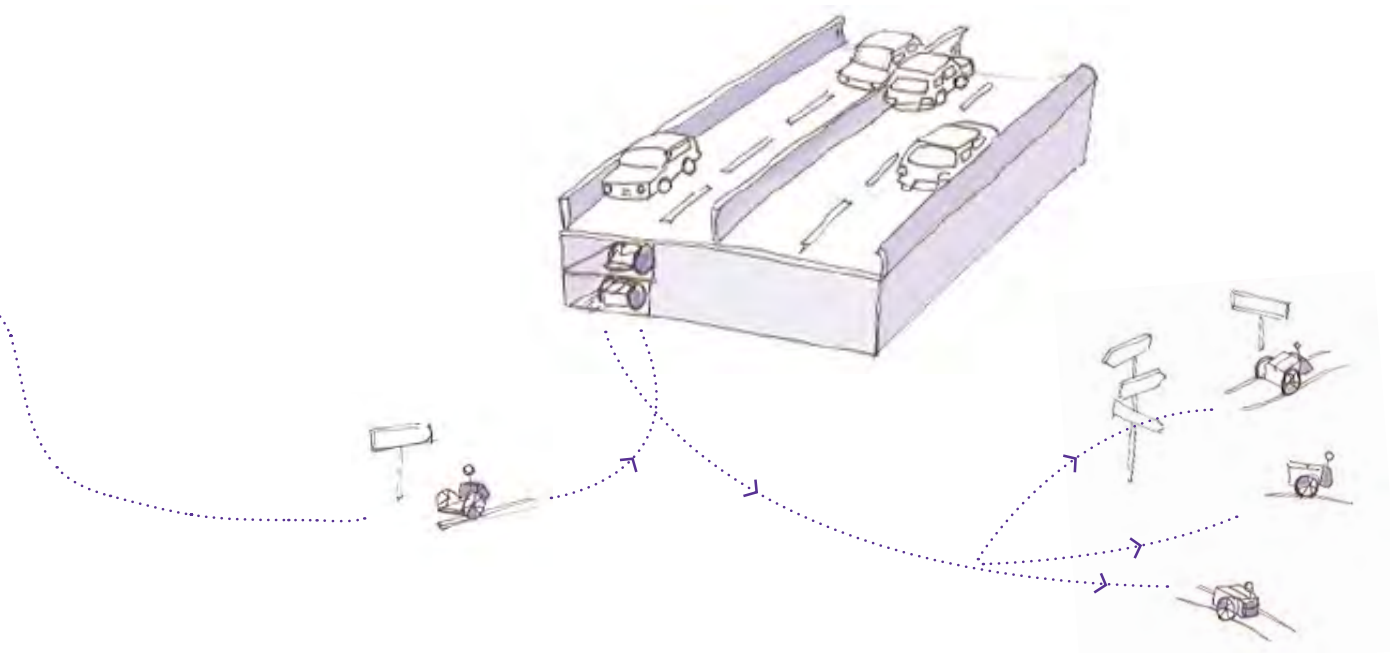
In what way is it innovative?

The logic behind routing parcels here is the reverse of current logic. While outbound transport takes place in shared spaces (roads) and delivery in clean spaces (delivery site), here, it is outbound transport that takes place in clean spaces (tunnel, reserved lanes) and delivery in shared spaces (dynamic parking).

In addition, through the use of driverless vehicles, delivery

time slots can be extended and better adapted to the needs of recipients.

The mixed use of the road network allows spaces to be reserved dynamically for corresponding uses based on the need of each moment. A three-dimensional vision of the road network adds new value to spaces located below and above, thereby creating opportunities for optimisation.



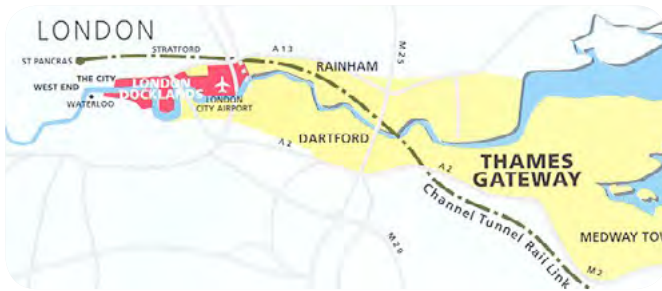
Along thoroughfares, light logistics infrastructures are conceptualised to make the logistics invisible and autonomous using rolling drones.

Going further...

- What optimal size for infrastructures in terms of the average size of parcels?
- What ways for the maximum reduction of the cost of redesigning infrastructures?
- What means for financing? What pricing system?
- What methods to make roads safe and protect parcels transported by drones?



LONDON, AN URBAN VOLUNTARISM



Country: United Kingdom
Number of inhabitants: 8.4 millions

Surface area: 1,572 km²

Density: 5,354 inhab/km²

Average congestion ratio: 37%¹

Model: global city

¹ Ratio between the immediate number of vehicles parked and the number of authorized spaces

London illustrates the problems of an attractive international big city. A commercial, financial and cultural hub, London is also a large residential metropolis with supply, congestion and pollution problems. If the London public transport network is considered one of the best in Europe, London also stands out

for its innovative projects in the supply of goods and economic inputs: construction from the ground up of an ultramodern port, setup of a concentrated and mutualised logistics network and creation of a low emissions zone.

London Gateway: a distribution logic centred on the port

The Port of London, once at the heart of international trade, located 25 km from the city centre, is today, with a volume of 50 million tonnes per year, the third container port in the country.

40% of the merchandise imported into the United Kingdom comes from Asia. 70% of this merchandise transits through the port of Felixstowe, 150 km from the capital, and is then distributed in lorries to London and the rest of the country. The Port of London at Tilbury, for a lack of space and infrastructures and being away from the water, is losing its efficiency compared with the two leading British ports of Felixstowe and Southampton.

London authorities decided to revitalise the port and bring distribution and consumption sites closer together by adopting **a distribution logic centred on the port**. In fact, in 2010, the City of London handed over the operation of a new port terminal situated 30 km from the city centre to the third biggest port operator in the world, Dubai World Port. **An investment of more than \$1.5 billion enabled a new port terminal capable of receiving the largest container ships in the world to be opened in 2013.** The new and almost entirely automated terminal is capable of handling 50 million tonnes per year and

The London Gateway is currently functioning only at 10% of its capacity, but the new terminal is expected to quickly overtake the ports of Felixstowe and Southampton to better connect the British nerve centre with the rest of the world. This new commercial port project illustrates the new dynamics at play to facilitate exchange in a location with severe space constraints.



Photo credit: Department for Transport (DfT) London Gateway Port - CC BY-NC-ND 2.0

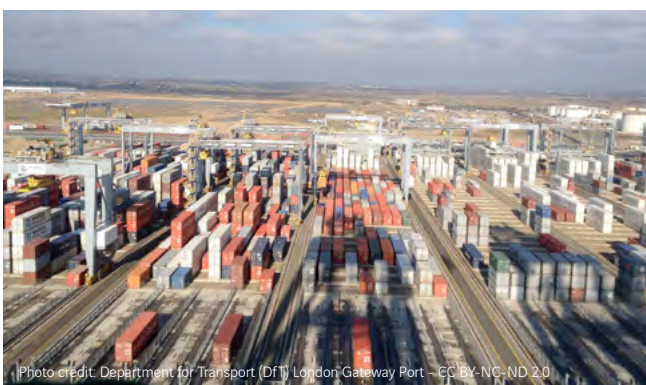


Photo credit: Department for Transport (DfT) London Gateway Port - CC BY-NC-ND 2.0

operates in all weather. Extremely well connected to the city centre by an effective and dense rail network – which should represent 30% of the merchandise routing from the port – and by motorway M25 nearby, the London Gateway may **reduce the number of lorries travelling between London and Felixstowe by 2,000 per day**. Backed up by a logistics park, the 60 ha terminal is an ultramodern multimodal platform with a capacity to easily service the British hinterland. **Once complete, the project will create 12,000 direct and 30,000 indirect jobs.**



London Construction Consolidation Centre (LCCC): a new logistics network experiment

If the consolidation of traffic flow is already a reality for a number of urban freight services (UPS, Fedex...), some areas are still not very affected. This is the case of the very fragmented construction sector which has numerous actors without any real supply mutualisation.

Therefore, in 2015, the Transport for London public organisation launched a **pilot project for a construction consolidation centre in the Silvertown district in London** with the mission of delivering just in time to four major construction sites in the city. Speed, punctuality, efficiency, transparency and optimisation: these were the project goals. The logic is simple: construction suppliers deliver only to the consolidation centre, which collects, sorts, prepares and delivers materials to sites in the last kilometre. **This mutualisation of the consolidation centre enables massification of traffic flowing into one point.** As a result, the vehicle fill rate is increased, the number of lorries in circulation is reduced and routes are optimised.

The rationale for the mutualisation and consolidation of traffic flow in a specific construction field is an interesting and pioneering example of the potential of reorganising the last kilometre in an international city.

The LCCC pilot project worked so well that it was extended by **the logistician Wilson James**. As a result, it now has **12,000 m² of storage space in London**. LCCC, which is capable of **delivering 500,000 palettes of construction materials per year**, delivers to more than **15 construction sites in the capital**.



The European FREVUE¹ project also enables several construction consolidation centres to be set up in London and even envisages the creation of temporary CCCs near large construction sites.

LCCC results are very encouraging: **5% fall in material wastage compared with the old system, 68% reduction in the number of vehicles involved in construction sites, 25% decline in accidents, 47% rise in productivity, 95% increase in the quality of delivery and 75% drop in carbon emissions.**

¹ Created as part of the EU's FP7 in 2014, the purpose of the FREVUE (Freight Electric Vehicles in Urban Europe) project is to show industrialists, consumers and legislators the point of green logistics in the city.



Low Emission Zone (LEZ): a voluntary policy for the enhancement of city dwellers' daily lives

In 2008, driven by the Greater London Authority, the Transport of London public organisation created the **largest low emission zone in the country**. The purpose was twofold: reduce congestion and improve air quality. This LEZ was the logical followup to the creation of a toll gate (£4 to £16) in 2003 to enter some neighbourhoods in the city. **This toll gate helped cut down 20% of daily traffic.**



The LEZ covers an area of 1,600 km², which represents the whole city of London. The most polluting vehicles – not conforming to European standards – are charged a daily rate if they enter this zone monitored by surveillance cameras. Progressively, the range of vehicles considered as being polluting is broadened. Boris Johnson, then mayor of London, envisaged that in 2020, only clean vehicles would be allowed inside the city. At present, heavy vehicles exceeding 3.5 tonnes, motor caravans, vans, 4x4s, pickups and minibuses that do not meet the Euro IV¹ standard are affected by this tax. **Daily fines vary between £100 and £200.** However cars, motorcycles and small vans are not affected by the LEZ..

¹ EURO standards, which are increasingly restrictive as they evolve, impose air pollutant emission ceilings for all new vehicles.



“In Europe, the cost of the damage to human health by pollution is estimated by the Institut d'aménagement et d'urbanisme de la région Île de France to be around €600 billion per year.”

*Territoires, incubateurs de santé (Territories, health incubators).
Les Cahiers de l'IAU îdF n° 170-171 - September 2014*

At the end of 2008, video surveillance showed that with the implementation of the LEZ, only 3% of heavy vehicles weighing more than 12 tonnes did not meet the standard whereas this would have been 12% without the LEZ. **The LEZ may have also helped replace 20% of heavy vehicles with cleaner vehicles.**

As for the balance sheet, the cost of implementation (£10.4 million) and operation (£7 million) of the provision exceeds the revenue generated by fines: £4.2 million. However, beyond the direct costs and benefits, the environmental and sanitary impact of London's LEZ remains to be established. The initial evaluation forecast a gain in 5,200 years of human life and the prevention of more than 300,000 cases of respiratory illnesses.

“The London Health Commission was given the task of putting forward proposals to improve the health of Londoners and make the British capital the healthiest international city. According to the Commission, it occupied a middle position, that is, 7th among 14 comparable cities in the world.”

*La Fabrique de la Cité, Designing cities for health
Read this study on our website La Fabrique de la Cité by clicking here.*

Key facts

- London is a city that has developed a policy of distribution centred around its port to bring the distributor closer to the consumer.
- A city that is overcoming its space constraints by constructing a new ultramodern port 30 km from the centre
- A city that is creating new effective logistics infrastructures in a few specific fields (for example construction)
- A city that has a voluntary policy of improving air quality by the creation of a Low Emission Zone to be extended





CITY AS A SERVICE



Satisfying the complex expectations of city dwellers/consumers is at the heart of private actors' logistics organisation and strategy and they benefit from a conducive environment created by the public actor.

Description

To increase their attractiveness, guarantee the well-being of their residents and better target investments, cities today are again placing citizens and their usage patterns at the centre of their concerns. This tendency leads us to believe that usage will become the main driver of urban transformations in the future. Influenced by customer behaviour, we also see logistics being strengthened on demand in business, particularly driven by the rise of e-commerce and the delivery model, sometimes express, to individuals. The major e-commerce platforms and delivery service companies are taking an increasingly important place in city logistics, which is starting to be structured according to their needs.

Finally, data and digitisation is allowing logisticians to push the optimisation of their operations and city dwellers to take part in the routing of goods by tapping into the logistics potential and organising themselves.

On the strength of these considerations, this scenario emphasises the satisfaction of city dwellers/consumers, with all its ambivalence, at the heart of the urban system. This customised logistics on demand is favoured and the idea of service becomes crucial in the field of logistics. In response, businesses get organised to meet the needs and expectations of their clients to the best of their ability while maximising their profits. The public actor remains in the background and concentrates on creating the necessary conditions for businesses to develop their solutions.

City dwellers become full participants in the movement of goods by promoting their "logistics potential" and guiding the responses of logisticians through their consumption habits and their strong positions as members of organised citizen structures.



From now on, I can also choose to pick up my parcel on my Home-Work route when it's convenient.
From time to time, I make a few deliveries for other individuals for a small payment.

Malika, city dweller

I had free storage space in my shop, so now I'm acting as a hub for some of the parcels bound for the city centre. Every day, individuals and professionals come to pick up or drop off their parcels at my shop.

Hugo, shopkeeper



The competition between logisticians has worsened and we should constantly innovate to offer services that are always better adapted to the needs and complex expectations of consumers.

Samir, logistician

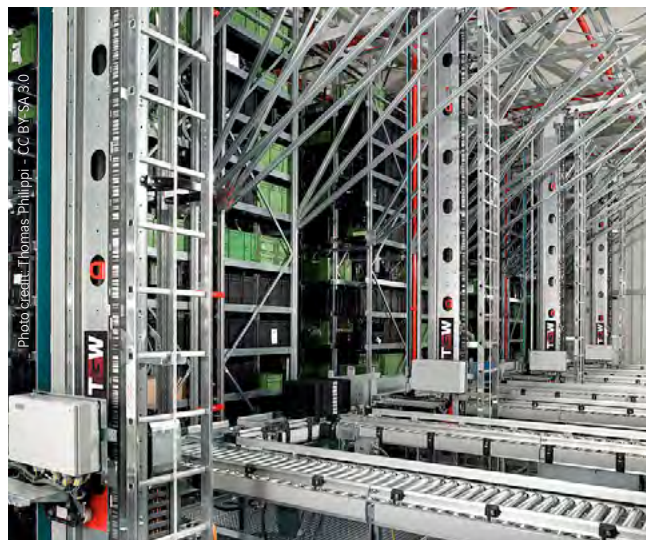
1

TOWARDS DENSER LOGISTICS OPERATIONS THROUGH AUTOMATION?

MORIN LOGISTIC

Morin Logistic (Le Groupe La Poste) is an e-logistics leader. The company works with about sixty clients and manages the stocks and deliveries of B to C companies such as Sparto (shoes) and Rue du Commerce, but also supports B to B clients. Its cutting-edge logistics units prefigure what could be the warehouse of the future. In warehouses grouped together over **140,000 m²** of space near Lyon, **500 people** each day ship more than 40,000 B to C and B to B e-commerce parcels, that is, around **10 million parcels** per year. Robotics, connected objects and computerisation provide new optimisation relays for logisticians and are the engines of a revolution in logistics warehouses. Unique object identification using RFID tags, geopositioning inside locations, automated sorters, inventory drones and similar provisions will **slash non-productive time, limit the risks of error, increase stock density and improve the quality of working conditions and safety**. B to C e-logistics corresponds more to the logistics of detail with the preparation of unit parcels intended for end users. The repetitiveness of tasks requires a mechanisation that is not necessary for B to B logistics, rather than being directed towards the **palettisation and massification of the merchandise ordered**. Merchandise specificity and needs can explain the appearance of specialist logisticians. Warehouses must adapt to great variations in activities (sales, end-of-year holidays...) and automation helps **regulate the process and make movements denser**.

Warehouses are generally installed near large consumer bases and roads. The main consequence of centralised logistics in large warehouses is that **logistics installations remain concentrated in Paris and Lyon**, neglecting port cities such as Le Havre and Marseille. Logistics in France is relatively very little automated because **low real estate prices in low density areas** permit the installation of sites with large surface areas instead of optimising space. **The densification of operations** facilitated by automation may counter logistical spreading and lead to the installation of logistics closer to urban centres.



Half of logistics real estate investments over the past 35 years were made in 172 communes.

More than 50% of distribution actors make rounds that average above 60 km.

(source: Duong, P. et al. (2013) Le renouvellement du parc d'entrepôts en Ile-de-France (The renewal of the warehouse park in Greater Paris). SAMARCANDE TLT - SCET - for the DRIEA)



Topics for reflection

- Increase in the size of warehouses and distance of logistics installations in relation to urban agglomeration centres
- Concentration on consumer bases to mutualise movements around major roads
- Automation and data enabling the densification of operations

2

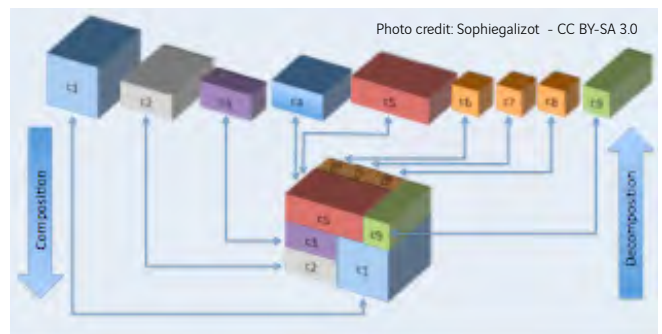
PROMOTE MUTUALISATION THROUGH INTERCONNECTED LOGISTICS AND STANDARDISATION OF CONTAINERS?

MODULUSHCA, XCHANGE, MIX MOVE MATCH

Modulushca (Modular Logistics in Shared Co-modal Network) is a research project supported by a consortium of 15 European actors (logisticians, industrialists, universities...) and funded by the European Union. The project aims to evaluate how the principles of the Internet may be applied to logistics, or in other words, how to rethink the way in which physical objects are manipulated, moved, stored and used. The project focuses on two areas: **interconnected logistics and the modular and standardised container** that can be used from factory to shelf. Interconnected logistics is contingent on the **real-time traceability** of goods made possible by the Internet and the **interconnection of the computer systems** of various logistics links. Merchandise travels from hub to hub and is transferred from one container to another to optimise loading based on destinations. So, the system depends on a logistics network that is more tightly linked with more frequent transfers to optimise resources and streamline usage. It is based on a system of standardised connected containers facilitating handling and filling through different logistics methods.

Optimisation by data and mutualisation is also at the heart of **xChange**, the marketplace created by BCG which allows various actors in the supply chain **to buy or sell available space in containers**. Launched in November 2015, xChange has already brought together 12 transporters representing 35% of the volume worldwide.

3M is also an initiative born out of a mutualisation effort in the area of road logistics. In partnership with two transporters (DHL and Gebrüder Weiss), 3M developed **an optimisation algorithm of vehicle fill rates and journey mutualisation**. Deployed in consolidation centres, the computer system is combined with an operation method permitting cargo to be reconfigured to optimise long-distance transport.



50-60%, estimated vehicle fill rates for road freight in Europe.
In Europe, around 1 in 5 lorries run empty

(source : Eurostat (2012) Road freight transport by journey characteristics)

90% vehicle fill rates for journeys organised by
MixMoveMatch

Collaborative platforms reducing the costs by 20% to 30% on average vs. conventional delivery in the last kilometre of delivery.

(source: Libeskind, J. (2015) La logistique urbaine : les nouveaux modes de consommation et de livraison (Urban Logistics: New Modes of Consumption and Delivery). Paris : Broché)

Topics for reflection

- Reduction of the number of freight vehicles (with identical volume transported)
- Densification of the logistics network

3

PICKUP POINT, INSTRUCTIONS, DISTRIBUTORS... HEADING TOWARDS THE END OF HOME DELIVERY?

AMAZON, LA POSTE, PICKUP, RENZ

The actors who are behind these initiatives have similar reasons: **reduction of the cost of logistics** by avoiding personal home delivery, **funding transit sites to make spaces more attractive** or **to create additional services for city dwellers-consumers**.

In fact lockers help increase the number of parcels delivered on the first attempt (delivery rate). **Up to 40% of parcels are still pending delivery after the third attempt** (InPost). On the other hand, in lockers, parcels are picked up on average **0.8 days after delivery**.

La Poste and Packcity hope to deploy more than **1,500 automatic lockers in France** by the end of 2016 after an initial investment of €50 million. A thousand will be Pickup Stations already partially deployed in some SNCF stations. The mobility actor is in fact seduced by the concept that enables them to monetise passenger movements and offer additional services on travellers' routes.

E-businesses are also active in this sector, like Amazon, which recently installed lockers in the Euralille shopping centre. This is the third installation of lockers of this type in France for the e-commerce giant. The operation is simple. When a parcel is deposited in the locker by the transporter, the buyer receives an SMS with a code to enter. For e-commerce actors, **multiple stakes are involved: saving on logistics, seeking to raise their profile, promoting their offering or building their brand...**

Renz, the historic manufacturer of post boxes, for its part, is testing the model of **lockers directly integrated into the halls of new buildings**. The economic model is to be fine-tuned, but the first results of a pilot test conducted in Paris a year ago are encouraging and residents have increased **their purchase volume by 23%**.



Photo credit: Clive Darra - CC BY-SA 2.0



Photo credit: Erik Strandberg - CC BY-SA 2.5

In lockers, parcels are picked up on average 0.8 days after delivery.

(source : InPost 2015)

91% of online consumers want to combine parcel pickup with a planned activity.

(source : OpinionWay 2015)

90% of parcels are delivered on first attempt.

(source : ColisPrivé 2014)

Topics for reflection

- Fewer freight vehicles in the last kilometre
- More lockers in transport zones
- More interfaces needed between mobility and logistics system to streamline last kilometre logistics

4

IS LOGISTICS IN EVERYONE'S FUTURE?

STUART, TOKTOKTOK, AMAZON FLEX

With the proliferation of delivery models in the urban logistics sector, **new forms of work are emerging**, enabling city dwellers to take on various small jobs and create additional sources of income.

That is how **French startup Stuart built a roaming fleet of "runners"** – including students, unemployed individuals, self-starters, and pensioners – to make deliveries for local business partners – including florists, bakeries, and caterers – thereby helping them to compete against e-commerce giants. Wages for runners, which can be as high as €25 an hour, is based on the number of kilometres they travel and how much time they spend queueing.

Toktoktok is a 24/7 on-demand purchasing and delivery service for people who want to receive their orders – including restaurant meals, wine, flowers, and even pastries – in less than an hour. Runners go to the store, pay for the ordered item with a pre-paid card, and deliver the item to its final destination. According to the Toktoktok site, runners can earn up to €35 an hour.

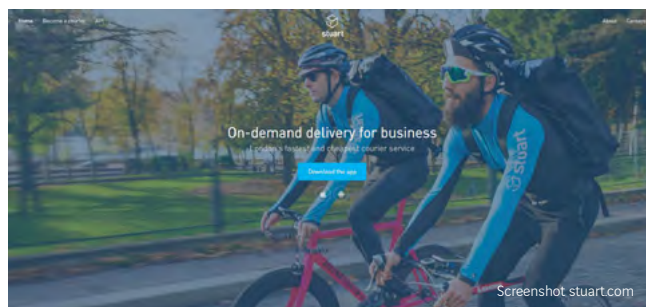
What if city dwellers were to become key players in urban logistics? This is a possibility that has not escaped the notice of the giant companies in this sector, for example, Amazon, which created its **Amazon Flex** platform in September 2015. For wages ranging from \$18 to \$25 an hour, freelance delivery staff (working two-, four- or eight-hour shifts) pick up ordered merchandise from warehouses near their homes or directly from delivery trucks. **This would allow Amazon to improve its effectiveness over the last kilometre and lower its delivery costs.**

This development in urban logistics, which creates small jobs is occurring concurrently with the emergence of slashers, independent workers who appeared during the last economic downturn and who have staked their claim for flexible employment.

**Typically, slashers take on various work activities on a temporary, contractual or entrepreneurial basis concurrently, successively or in alternation (for example, a graphic designer/blogger/journalist).*

Topics for reflection

- Increasing number of people making deliveries in the city using their own vehicles
- Reduction in the number of dedicated delivery vehicles in the city



French startup Stuart raised €22 million in capital in November 2015, with Geopost investing €10 million for a 22% share.

Toktoktok raised €1.5 million in capital in November 2013. In Paris, the company employs 400 runners. In Lille, where the service is being rolled out, 1,500 job applicants have signed up in two weeks.

« We're the anti-Amazon: no warehouse, the city is our inventory. »

Serge Alleyne,
Founder of Toktoktok

REAL-TIME MUTUALISED LOGISTICS

Presentation

The principle behind the concept of **real-time and demand-driven shared logistics** is that **all available logistics resources must be shared to enable custom and optimal itineraries** in a proactive manner. As a result, delivery decision-making can be flexible, that is, last-minute delivery decisions are possible based on the location of the merchandise, available logistics solutions at any given time of day, destination (home, workplace, places along one's daily commute), and delivery mode (electric vehicle, bicycle, by foot). All logistics players and citizens work in conjunction and pool their efforts to ensure each link in the logistics chain functions optimally. The system uses a **platform shared by clients** (both individuals and companies), logistics personnel, loaders, and last-kilometre players (individuals or public or private companies) to enable either B2C and/or C2C interfaces.

All logistics resources and itineraries, operated by individuals and companies, are captured in real-time on the platform.

The system allows individuals to be key players in the logistics process. A "citizen-logistician" can, for example, decide to use his home as a pick-up location from 11AM to 1PM on Thursdays or act as the shipper from the

train station near his home to the pick-up point near his workplace. For peer-to-peer transactions, **the use of blockchain technology helps to reinforce security** and make the process more transparent.

Default itineraries are used for as far as possible before the last-kilometre provider comes into play. The various logistics chain links are operated in accordance with a reverse-auction process and are established at the recipient's request or by default based on pre-set client preferences (location, rates, transport mode, schedules).

A dedicated application working in tandem with the platform manages contacts with the final recipient and transfer of the order. When logging in, recipients can choose from all available solutions at any given time for the delivery of their package. Once the delivery has been made, **a selfie-based system** – the recipient takes a photo of the package now in his possession on his application – is used to certify that the order has successfully been finalised.

Key figures

91%

of online consumers want to combine package pick-up with a scheduled activity.¹

95%

of the population is less than 15 minutes from a pick-up point on the road.²

30%

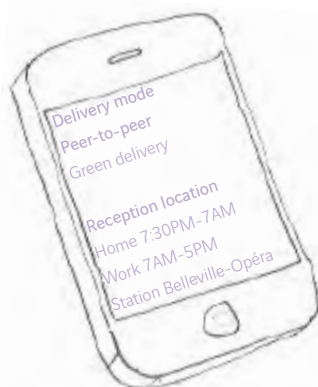
Collaborative delivery platforms help to reduce costs by 20 to 30% versus traditional delivery over the last kilometre.³

¹ _ OpinionWay (2015) *Le temps de la livraison (The time of delivery)*, survey for InPost carried between March 11 & 12, on a representative sample of 1 015 people

² _ Pickup (2015) *pickup.fr - Les actualités [online]*. Available on: <<http://www.pickup.fr/accueil/actualites-pickup>> [Read October 20, 2016].

³ _ Libeskind, J. (2015) *La logistique urbaine : les nouveaux modes de consommation et de livraison (Urban Logistics: New Modes of Consumption and Delivery)*. Paris : Broché

CONCEPT



Jean is waiting for a package. He has selected standard delivery and authorised peer-to-peer delivery.

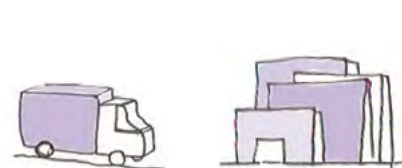
He has also provided information about his commute and preferences for receiving the package.



On the day of delivery, Jean has a doctor's appointment and won't take his usual route. He absolutely needs his package and selects express delivery at the location of his appointment, for which he pays an extra fee.

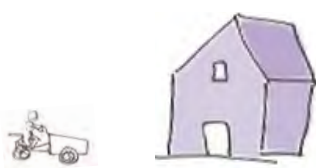


Finally, a taxi delivers the package to Jean. Jean takes a selfie with the package as proof of receipt.



Transporter

Warehouse



Transporter

Malika's home



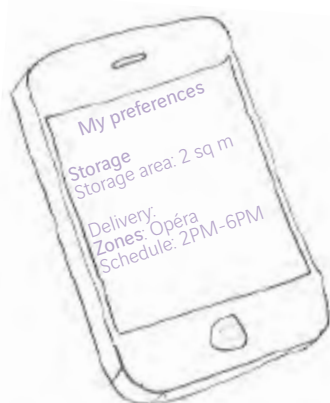
Taxi



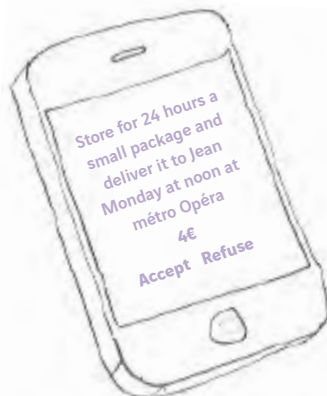
Generic itinerary

Preferred itinerary

On-demand post-transfer itinerary by Jean



Malika and Jean don't know each other but cross each other's path every day at the train station when Jean goes to work and Malika goes to college.



The platform tells Malika to collect a package this evening and deliver it to Jean tomorrow. She accepts the job. A delivery person takes the package to Malika's home, where it is stored for the night.



Malika

Opéra

Itinerary as per the original request

Since Jean selected another delivery mode at the last minute, a taxi comes to fetch the package. Malika is paid for her service.

Conditions for implementation

The effectiveness of this platform and the quality of the service are contingent on the offer to which the platform provides access. Sufficient offers help ensure attractive pricing, various alternatives in response to client need, and reliable delivery despite a segmented logistics chain. The platform's capacity to identify and attract enough logistics players is therefore critical.

To operate the platform, the presence of trusted third parties is essential to maintaining user interest. Third parties may include public- or private-sector players or citizens but also technologies such as blockchain.

In what way is it innovative?

Operating such a platform truly prioritises the expectations of citizens and consumers, creating offers to which they will respond. Integrating rich and diverse logistics solutions provides a more global view of the platform's uses and helps to regulate offers. The possibility of integrating C2C endows an occasionally constrained and inflexible professional offer with more opportunities for collaboration.

A proactive allocation of logistics capacities based on demand allows for one-time solutions, which gives the system greater flexibility and resilience.

Integrating trusted third parties only reinforces this concept's credibility.

Going further...

- What is the minimal viable volume for this service?
- What is the rate structure for this service (for sending and receiving) and the wage structure for logistics players (fixed or variable)?
- How are product returns managed?

THE MOBILE WAREHOUSE

Presentation

Just like the 20-foot container that was standardised in 1967 and is now found everywhere around the world, the concept of **the mobile warehouse is based on standardising packaging formats** specially designed for urban logistics.

The size of the urban logistics container is based on the size of pallets and a 20-foot equivalent unit. **It is modular and stackable**; its size was determined by careful study and is designed to **optimise the filling rates** of the various modes of transport. It can accommodate air, sea, river and road transport modes, allowing for **easy transshipment and simplified multimodal transport**. **It is associated with smaller transport units, which are also modular and stackable to maximise loading capacity**. **These smaller containers are secure and connected**. An electrical system can cool the container for the purpose of refrigeration. **Containers being easy to handle, logistics operations can be accelerated**.

Standardising transport units and packaging formats and sharing resources allow for **new transport uses and**

optimised storage. As a result, new storage zones can be created by converting unused space, for example, under bridges, in basements, parking areas, brownfield sites, and vacant areas. Mobile warehouses, which are associated with the development of self-driving vehicles, are basically parking areas in semi-urban zones equipped with charging stations where green vehicles handle delivery over the last kilometre.

In urban zones, the containers can easily be stacked near a shopping centre, thereby providing buffer inventory. Small retailers can also share their inventory since new "reversible" spaces in the roadway system can be used temporarily to stockpile storage containers. As a result, containers become a new form of urban furniture that blends in well with the urban landscape.

As we can see, urban logistics makes **use of flexible and reversible physical spaces while inventory is placed in such a manner as to respond quickly to peaks in supply logistics, minimise stockouts, and prioritise retail spaces over storage spaces**.

Key figures

41%

of warehouses are filled to less than 80% capacity.¹

65%

The average filling rate for transport vehicles is 65%... 20% of trips are empty haulage.²

34 million

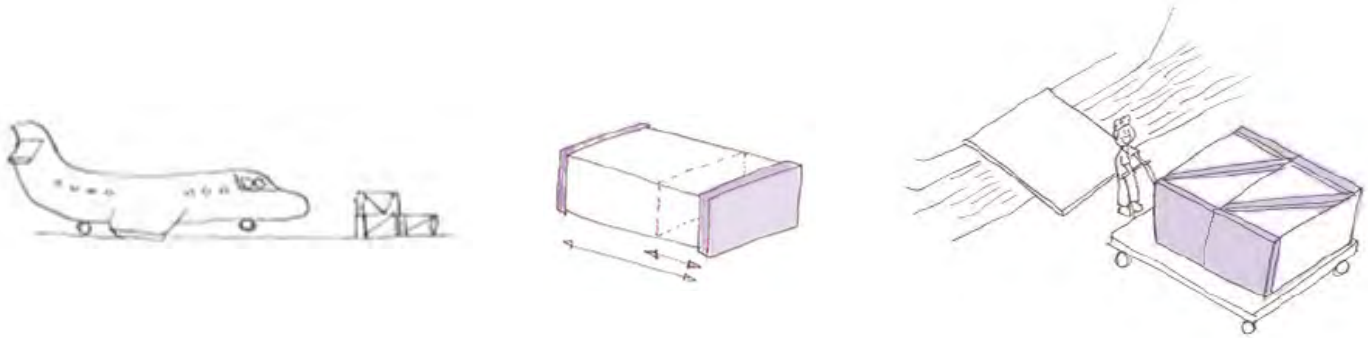
There are 34 million 20-foot-equivalent containers in the world.³

¹ _ Jacquesson, F. (2010) *Les entrepôts et leur activité*. Commissariat général au développement durable, July

² _ Eurostat (2010) *Road freight transport by journey characteristics*

³ _ World Shipping Council (2010) *Global container fleet* (available online at worldshipping.org/about-the-industry/containers/global-container-fleet, viewed on October 21, 2016)

CONCEPT



New packaging units are modular, stackable, and standardised, thereby optimising filling rates, speeding up handling operations, and facilitating multimodal transport.



Since urban containers are both self-sufficient in energy and secure, it is possible to convert unused spaces into temporary storage areas.



New reversible spaces in the roadway network can be used temporarily to stockpile storage containers. By stacking these containers in proximity to shopping zones, supply logistics comes to rely more on responsive inventory buffers located near consumer areas.

Conditions for implementation

Adoption of a new standard depends mainly on the ability of logistics players to firmly establish the standard worldwide. This would involve buy-in from key links in the supply chain, for example, large distribution companies that would consider this a profitable endeavour and would drive growth.

The emergence of this new type of container must also lead to a redefined use of urban space to provide storage areas for these containers. This would involve, for example, restructuring road parking in a dynamic manner, at least partially, and converting unused spaces (areas under bridges, vacant lots, and so on) into productive storage zones.

In what way is it innovative?

Ushering in this “mobile warehouse” allows us to extend standardisation downstream in the logistics chain, closer to the products’ final destination. It favours the sharing and rationalising of the supply chain on a wider scale for greater effectiveness.

The flexibility of this new standard facilitates its integration in the urban landscape and makes it possible to apply

proactive inventory-management solutions in close proximity to consumer areas.

The notion of using flexible and reversible spaces for the purpose of inventory facilitates conflict-management and fosters synergies with other urban practices.

Going further...

- What players have the most to gain from making the initial investments? How do we encourage adoption of such a standard?
- How do we combine low-cost packaging units with a set of desired functionalities (connectivity, refrigeration, content segmentation, automation, security, and more)?
- How do we encourage the adoption of the new containers without harming medium-sized players that have less power than the giant companies in the logistics sector?



Rathaus

HAMBOURG, EXCHANGE CITY



Country: Germany

Number of inhabitants : 1,7 million

Surface area: 755 km²

Density: 2 339 inhab/km²

Average congestion ratio: 32%¹

Model: exchange city, 2nd container port in Europe

¹ Ratio between the immediate number of vehicles parked and the number of authorized spaces

Hamburg is a prosperous city that has been a trading centre for several centuries. In the 16th century, it used to be a key player in the Hanseatic League, a commercial association of towns in northern Germany. Today, it is the site of that country's largest commercial seaport with connections to South America and Asia. Some **11,000 ships carrying 9 million containers** dock every year at Hamburg; these vessels come from 170 countries and 900 ports. Hamburg is a hub where merchandise transits prior to redistribution to other cities across Europe. The city is home to 3,000 import and export companies. The port accounts for **15% of the jobs in the city and 20% of its GDP. Fifty-nine percent of the merchandise is earmarked for European distribution**, with the rest going to international trade.

Hamburg is a perfect illustration of the close relationship that can exist between a city and its port – as well as the challenges this entails. While residents want a healthier living environment and more consumer goods, the port must keep supplying the city in an increasingly constrained space that is being nibbled away by urban development. A project designed to convert a site at the port where coffee warehouses used to stand into a luxury residential district, known as HafenCity, illustrates this uneasy cohabitation. HafenCity, which showcases luxury lofts, premium office space, and some warehousing facilities, is now a UNESCO World Heritage site.

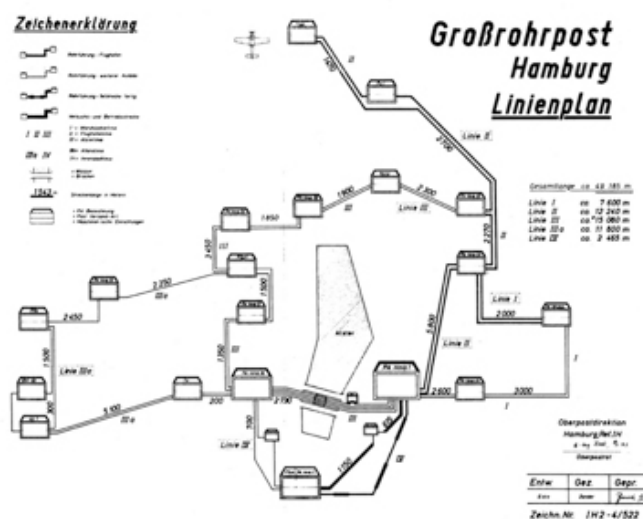
« There's a certain incompatibility between citizens' expectations for a healthy, calm, and uncongested living environment and their desire for same-day deliveries. »

Sasha WESTERMANN

Head of Intelligent Intermodal Traffic Management, HPA

In addition, for the past several decades, Hamburg has been an active media centre (TV, press, publishing, and printing) – which is why there are so many couriers in the city centre. These couriers used to deliver print documents; since the emergence of digitisation and e-commerce, they have been delivering packages.

Hamburg is equipped with a vast, disused network of pneumatic tubes, which was developed throughout the 20th century in response to growing media-related needs. According to Wolfgang Beecken, a consultant with First Mile (a firm specialising in urban logistics, particularly last-kilometre delivery issues), this transport system may be rehabilitated to convey certain types of goods rather than paper documents.



Hamburg network of pneumatic tubes – 1963

Références : Planung der OPD Hamburg vom 8. August 1963 für den Bau der Großrohrpost Hamburg. Sammlung telosaraphein. Prof.Dr. Nemo Klein. 20. September 2006

CITY CASE

The port of Hamburg: a multimodal and automated platform

Over time, the port of Hamburg has become a critical hub for trade in Europe thanks to its multimodal infrastructure and its well-developed hinterland network. Some 500,000 tonnes of merchandise are transferred every day from boats to trains, planes, and trucks. The 115-kilometre-long Elbe Lateral Canal connects the port to the rest of the river network in Germany and provides access to the 326-kilometre-long Mittelland Canal, which crosses the country from east to west. The rail network at the port of Hamburg is one of Europe's most connected with **200 trains, 5,000 railcars, and 40,000 heavy goods vehicles** departing from the city every day.



The port of Hamburg is well-connected to Eastern Europe and supplies its cities in goods and materials.

Burchardkai Terminal in 1971



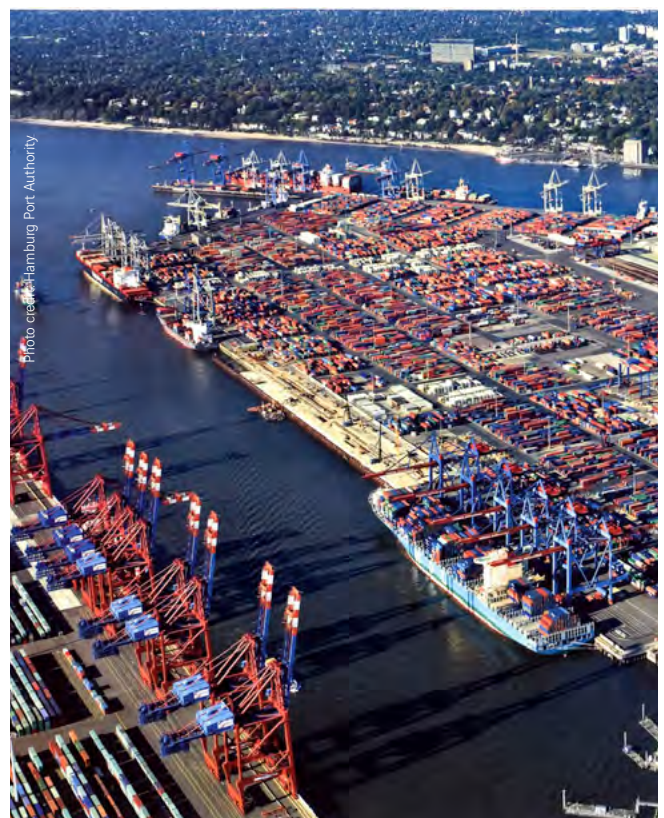
The port of Hamburg is 820 years old and is characterised by a multiplicity of canals and routes that criss-cross, which hampers the flow of goods. The port must handle ever-increasing flows in a space that is extremely dense and constrained.

« The port has to deal with the dual pressures of diminishing surface space and the intensifying flow of merchandise and raw materials. »

Sasha WESTERMANN

Head of Intelligent Intermodal Traffic Management, HPA

Burchardkai Terminal in 2008



Strategies at the Port of Hamburg

To respond to the increasing movements of goods, the Hamburg Port Authority (HPA) is investing in the digitalization of its infrastructure, coordinating the various stakeholders and vehicles that circulate and interact in the port, and developing optimization strategies to improve traffic flow within the port.

The HPA is investing in self-driving vehicles to better operate its logistical infrastructure. Its state-of-the-art Altenwerder terminal is fully automated: **84 self-driving trucks operate 7 days a week, 24 hours a day**, nearly year-round. These automated vehicles load and discharge heavy ship containers rapidly. While traditional terminals handle between 20 and 30 containers per hour, **the Altenwerder terminal moves between 50 and 60**. The terminal has therefore accelerated goods movement, becoming 30% more efficient. The port of Hamburg has begun to modernize all its terminals so as to optimize flow management.

The HPA is also counting on its **SmartPort Hamburg** project to improve traffic flow using data. To this end, since 2014, the HPA has been working with the U.S. computer giant Cisco Systems to modernize its infrastructure. The port has recently invested in an IT system connecting the 400,000 trucks circulating in the port **in order to better anticipate their movements**. An anti-traffic jam application provides traffic status in real time, informs heavy vehicle drivers of ships' arrival times, and indicates available parking spaces as well as infrastructures with unencumbered access. This information system improves traffic flow within the port and relieves congestion in the old city, since many of the trucks use the tunnel north of the port, which is also used by the city's inhabitants.

The HPA also plans to optimize traffic by modernizing train access to the port. **The port has begun optimizing train arrivals and departures using an IT platform**, transPORT, that collects various data: arrival times, delays, changes, space available in the train cars, itineraries, etc. The Port of Hamburg thus has a modern IT system that allows it to manage train traffic with precision.

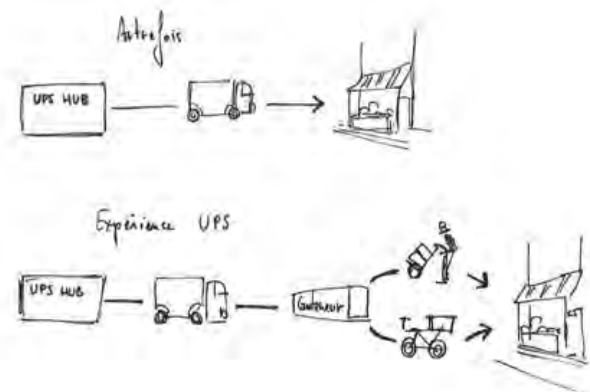
Finally, the HPA is working in partnership with other ports on interport movements to regulate the cruising speed of ships upstream and thereby prevent congestion. To do this, pooling ship data (load, size, location, itinerary, time of departure) is essential. The HPA is currently working on this project in partnership with the Port of Shanghai.

Partnership between the city of Hamburg and UPS

While Hamburg enjoys international renown for its port, the city is also encouraging local initiatives aiming to improve urban freight traffic in the old city.

For nearly a year, the city of Hamburg has been working in partnership with the logistics company UPS, which is setting up **miniaturized distribution centres throughout the historic city** to serve the inhabitants on a long-term basis over the final kilometres. Some 300 to 400 packages are placed in the containers in the early hours of the morning. The packages are then carried on foot or by bicycle **within a radius of 2 to 2.5 km**. According to Frithjof Büttner, Business Improvement District program director with the Hamburg urban planning and development agency, only one container per district is required to ensure sustainable delivery over the last kilometre.

To date, the changes have resulted in improved traffic flow, more parking spaces available, and a reduction in polluting emissions. UPS and the city of Hamburg will publish a detailed report by the end of the year with figures to quantify the improvements observed. Beyond the numbers, UPS is rethinking the esthetics of the infrastructure, to have it blend into the urban landscape. Among other things, UPS is considering developing a platform that would conceal the container underground during the night. The cities of Dublin, Essen and Cologne have also taken an interest in the project.



UPS container for last kilometer delivery

Key facts

- The city's interests are not always in line with those of the port
- Efficiency and prosperity are guaranteed by the port's multimodal character as well as its close connection with the Hinterland and the rest of the world
- Optimization and automation make the port a highly productive space

ROOTED CITY



Exploitation of a territory's productive potential and development of a circular economy are supported by synergies between public and private stakeholders (businesses, associations and citizens)

Description

Lately, number of experiments in agricultural or industrial production in dense urban settings has increased. However, the amateur character of the first initiatives is slowly being replaced by better designed experiments that make use of innovative and efficient technologies to maximize the returns while reducing or eliminating the pollution generated. The encouraging results obtained with these technologies allow for the envisioning of urban production on a much larger scale, without negatively affecting the quality of the urban space. Generally speaking, this return to local production is led by a number of stakeholders who are aware of the benefits to be gained from these approaches in terms of the territory's resilience.

At the same time, the development of "maker" processes marks a renewed interest on the part of city dwellers for self-production, and perhaps foreshadows a profound change in product consumption modes and life cycles.

Finally, the efficiency of recovery and recycling channels is continually growing, while recent advances suggest strong development potential.

In line with these observations, this scenario envisions a city that seeks to reinvent itself by capitalising on its territory and local potential. It rediscovers a relative production capacity, without laying claim to self-sufficiency. The value of the periurban and rural territory is thus highlighted and directly connected to the city centre and its market of consumers.

Circular economy is also crucial. Goods and materials are increasingly directed into the shortest and most relevant recovery loops.

Through their modes of consumption and their active participation in production, city dwellers are becoming important players in this evolution. Public and private players (businesses, associations and citizens) are working in synergy to get the most out of their shared territory.



I'm a member of a community recycling facility. I go there regularly for assistance and advice on repairing broken objects. I've fixed up my bicycle, my coffee machine, and my kitchen chairs!

Malika, city dweller

We applied the Small Business Act to set aside a share of the public markets for regional players, as part of a strategy to promote short travel distances and local farming.

Jean-Pierre, local authority representative



Our products can be fully repaired, and our clients have access to an online store for spare parts. A collective manual—updated internally and by the users themselves, and available as an open source document on the Internet—keeps track of problems, as well as solutions to resolve them.

Thierry, manufacturer

1

URBAN AGRICULTURE ON A COMMERCIAL SCALE?

LUFA FARMS

Lufa Farms specializes in new urban agriculture technologies. In 2011, the Canadian company opened the world's first commercial greenhouse **built on an industrial rooftop**, in Montreal. With a floor space of 2,880 m², the greenhouse uses technologies specifically adapted to urban farming. Nutrients are supplied to the plants using hydroponics, avoiding the presence of earth. In addition to capturing rainwater, all water is reinjected into the system, and all organic waste is turned into compost. No pesticides are used. The greenhouse is managed entirely by computer, and it produces year-round, compared to 4-6 months of inactivity for a traditional farm. **Lufa Farms produces over forty varieties of vegetables and more than one thousand baskets per week, or roughly 700 kg per day.** An investment of close to \$3 million was required to set up the farm.

A second farm was opened on the roof of a new building, significantly reducing the construction costs since specific constraints related to setting up the greenhouse were integrated into the design right from the start. This roof-top farm, located in the south of Montreal, has an area of more than 4,000 m² and is currently the largest in the world. It integrates technologies that are even more advanced than the first (regulation of air pressure to ward off insects, systems management using iPads, etc.).

40% of gardens, 5% of public squares and 60% of roof-tops: that's the surface area that market gardening should occupy in Rennes to help make the city self-sufficient.

(source: Darrot, C., Boudes, P., dir. "Rennes Métropole, Ville vivrière?" Laboratoires de développement rural, 2011)

41% and 71% of fruits and vegetables available in Rungis come from elsewhere.

(source: Cazenave, C. "Nos villes en 2050 - Dans le ventre de la ville." Terra Eco, special edition, October-November 2012)

Topics for reflection

- Recovery of "lost" spaces (roofs)
- Development of a local logistical network



Besides urban production, another original aspect of Lufa Farms is its distribution system, which allows the company to distinguish itself from community supported agriculture programs (where consumers buy a share of the season's harvest directly from the producers) or community gardens. For a minimum of **\$30 a week**, customers can order their basket online, **by means of an adapted e-commerce platform**. Lufa Farms have entered into partnerships with other local producers so that their baskets also include choices such as fresh bread, honey, grains and spices. A well-greased logistical structure then takes over. The products are collected from all the producers, **the baskets are put together during the night, and then they are delivered to pick-up points across the city.** This economic model allows a farm to become profitable within 18 months.

However, this success should not obscure **the difficulties of designing and financing** this type of initiative. Lufa Farms enjoyed the support of sizeable fund-raising campaigns and exclusive partners such as KUBO, a major greenhouse designer. The technical difficulties of designing the farms, the strict standards that must be adhered to, the extremely complex logistical model, and the need for large roof-top spaces can all be barriers to the widespread development of commercial urban production.

2

3D PRINTING AND FAB LABS: REINTRODUCING INDUSTRY INTO THE CITY?

BARCELONA

3D printing has emerged in the world as a vector for innovation, prototyping and collaborative production. **But 3D printing is also playing an increasingly bigger role in the production chain.** In industry, in some segments of production and in some sectors (such as health, automobiles or aeronautics), 3D printing's appeal lies in its customization capacity and its lower costs. **Sales to individuals have also exploded**, increasing by 346% between 2008 and 2011. For example, numerous companies such as Sculpteo and MakerBot offer 3D printers and 3D printing of various objects, while Amazon began selling 3D printed objects in 2014, with nearly 4000 item numbers.

Parallel to the development of 3D printing, **a whole culture of makers — do-it-yourselfers (DIY) — and upcycling has taken shape, upsetting traditional ways of innovating, prototyping and producing.** The creation of fab labs around the world is one manifestation of this culture, which has the potential to profoundly alter tomorrow's means of production. The Opendesk platform provides a glimpse of this potential. It matches customers and furniture designers around the world. Once the design is purchased, the platform finds the closest fab lab or craftsman to make the furniture (Open Making). Going one step further, **the city of Barcelona intends to incarnate this change by moving from "fab labs" to "fab cities."** With the opening of neighbourhood micro-factories, the municipality wants to create self-managed places, that is, managed by residents who can carry out the production and recycling of goods and services according to the neighbourhood's needs. The equipment, materials and human resources of the fab labs will be adapted to the local cultural, environmental and socio-economic context. Four of these Ateneus de Fabricació have now opened in Barcelona.

Taken as a whole, **we are seeing the beginnings of a reorganization in the modes of production**, the scope of which is still difficult to measure, but which suggests a relocation and diversification of production sites and "producers," collective sharing of production capital and of the knowledge tied to this capital, on-demand and universally accessible production, and principles of short, virtuous channels on the scale of a neighbourhood or city.

To find out more, watch our video on Lisbon fablabs on the website of La Fabrique de la Cité - or click [here](#)



Photo credit: Muse Fablab - CC BY 2.0

As of 2011, only about 25 percent of the additive-manufacturing market involved the direct manufacture of end products. With a 60 percent annual growth rate, however, that is the industry's fastest-growing segment

(source: Cohen, D., Sargeant, M., Somers, K. "3-D printing takes shape." McKinsey Global Institute, January 2014)

Boeing already uses printers to make some 200 part numbers for ten different types of aircraft.

(source: Cohen, D., Sargeant, M., Somers, K. "3-D printing takes shape." McKinsey Global Institute, January 2014)

Topics for reflection

- Changing the nature of goods transported through the city (finished products vs. raw materials) and therefore the infrastructure required (delivery areas)
- Creation of "productive" spaces within cities

3

FROM BEING REPAIRED TO BEING REUSED, HOW MANY LIVES WILL OUR OBJECTS HAVE?

REPAIR CAFÉ, LEBONCOIN.FR

A return to simplicity and frugality is taking place in the city, driven by the desire to **give a second life to the objects we buy and consume**. Waste is considered a resource in itself, and products are designed they can be repaired and reused, indefinitely.

At the same time, start-ups such as UpCycly and Wiithaa or the Réseau des Ressourceries in France (network of reconditioning centres) are being created to support the development of a collaborative circular economy, inviting city dwellers to repurpose their (un)used goods and recover the waste in their cities.

Originating in Amsterdam in 2009, **Repair Cafés** are collaborative, travelling workshops created to **fight back against programmed obsolescence and to extend the useful lives of everyday objects**.

Citizens gather there to craft and repair their objects—clothing, furniture, bicycles, toys, etc.—together, around a coffee. Free and open to anyone, these Repair Cafés provide their visitors with all the tools needed to repair their objects as well as volunteers with expertise in various fields. Since 2011, the Repair Café Foundation has been supporting the growth of these workshops around the world.

Parallel to this, the second-hand market is gaining strength, as attested by the success of platforms such as **eBay or Leboncoin**, now one of the five most consulted sites in France: 1 out of 3 people in the country connect to it each month. In December 2015, there were **26 million ads** on the site.

The very linear consumption system leading to profit is therefore being abandoned for a **more circular paradigm**.

The Repair Café of Vauréal (95) in numbers

- 3 events
- 584 visitors
- 250 repairs
- 48 participants
- 600€ per edition



Photo credit: #PhilippeCPhoto - CC BY-NC-SA 2.0

972 Repair Cafés worldwide (mainly in Europe and the EU).

9.3 million tonnes of goods that could have potentially been reused or repurposed came to the end of their usage in France in 2012. Only 10% were in fact reused or repurposed

(source: Hestin, M. et al. (2014), Panorama de la 2e vie des produits en France. BIO Intelligence Service pour l'ADEME, Octobre)

Around 42 million tons of electric and electronic waste were produced in the world in 2014. 6,5 million tons are handled and recycled (15,5%) according to the highest standards.

(source: Baldé, C.P., Wang, F., Kuehr, R., Huisman, J. (2015), The global e-waste monitor – 2014, United Nations University, IAS – SCYCLE, Bonn, Germany)

57% of French people have sold one or more items to other individuals through Leboncoin and 55% have bought one or more items on the site.

(source: Ipsos, ADEME (2014) L'émergence des pratiques «co» en France : vers un nouveau modèle social ? [Online] Available at: presse.ademe.fr/wp-content/uploads/2014/12/Les-pratiques-CO_%C3%A9tude-Ipsos-pour-Ademe-2-d%C3%A9cembre-2014.pdf [Accessed 21/10/16])

Topics for reflection

- Reducing the quantity of waste to be treated, and therefore to be collected and carried through the city
- Decreasing the number of purchases and therefore the amount of deliveries

THE CIRCULAR CONSTRUCTION SITE

Presentation

How can construction or deconstruction sites be transformed so as to reduce environmental pollution and create value? That is the goal of the **circular worksite concept**. To achieve this, the concept aims to:

- maximize reuse and recycling of materials between deconstruction and construction sites by **creating shorter logistical routes by means of buffer stocks and a materials exchange**
- strengthen the supply of **locally sourced materials** for construction sites
- raise awareness and **involve associations and citizens** in the process of recirculating materials
- at the centre of the concept lies the introduction of a national digital platform: the materials exchange.

This platform seeks to align supply and demand and to connect the various players: construction/deconstruction companies, suppliers of primary or secondary materials, processing plants, recyclers, players in the social and solidarity economy (SSE) and citizens.

Right from the design phase, the builder queries the platform to eco-design the building, make choices **according to the future availability of materials**, and reserve the materials that will be needed. Building Information Modelling (BIM) and new design tools provide a precise view of all the components and materials that will be present in the building at the delivery stage; some components also contain RFID chips to **provide greater traceability and better direct supply**

flows. This information will also facilitate the building's deconstruction at the end of its life and **renew the virtual stock**.

By aligning supply and demand, as well as involving citizens, **materials reuse and recovery is maximized** at all stages of the building's life cycle. For example, during construction, topsoil is bagged directly and can be sold to individuals. During demolition, reusable components are fed into the channels of the Social and Solidarity Economy, thus avoiding the processes of dismantling/recycling raw materials, which require transport and result in losses of material.

The materials exchange creates a unique virtual stock. Meanwhile, in the physical world, the circularization of materials is made possible **by means of regional platforms and local micro-stocks**. **Located along major water, road or rail transport routes**, the regional platforms integrate **transformation/recycling ecosystems**, some containing skills specific to the local context (e.g. wood processing in the south-west, hemp and linen in the west). The micro-stocks are **managed on a city scale in a dynamic way**. This new organization **reduces transportation nuisances** while opening the doors to new practices. Rounds between worksites and micro-stocks are made by clean vehicles, storage zones on the sites are smaller, while the micro-stocks allow for multi-site possibilities through the pooling of stocks.

Key figures

65% vs 28%

65% of the 50 million tonnes of construction waste produced each year come from demolition, 28% from rehabilitation and 7% from new construction.¹

15

The London Construction Consolidation Centre is currently servicing 15 major construction projects in the capital.²

30 billion

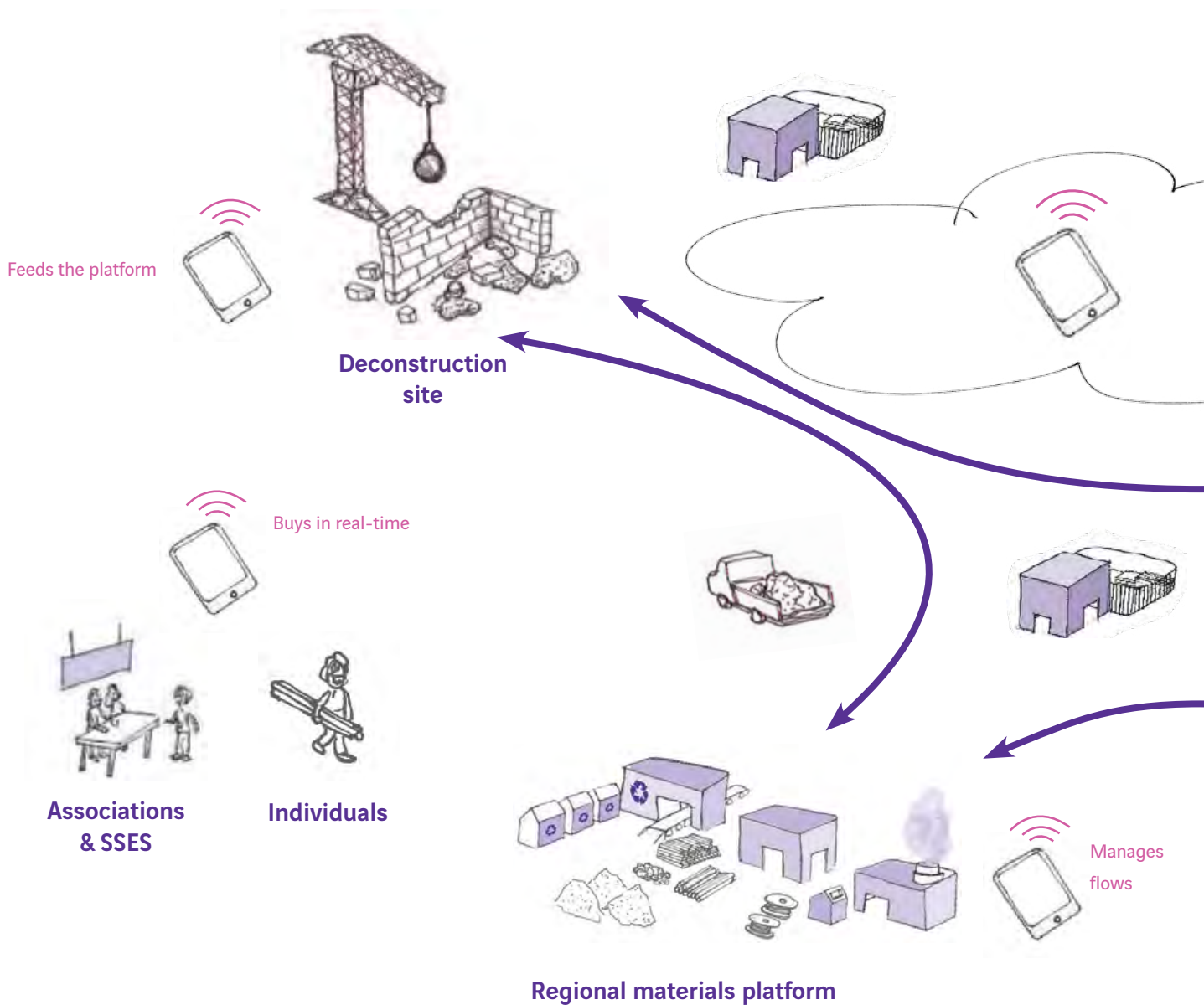
Each year, domestic road transport of construction materials accounts for 30 billion tonne-kilometres.³

¹ _ Ministère de l'environnement, de l'énergie et de la mer (2010) Déchets du bâtiment [Online] Available at: developpement-durable.gouv.fr/Dechets-du-batiment,19574.html [Accessed 21/10/16]

² _ Freight in the City (2015) London Construction Consolidation Centre doubles in size as contractors realise benefits. [Online] Available at: freightinthecity.com/2015/04/london-construction-consolidation-centre-doubles-in-size-as-building-works-boom-in-the-capital [Accessed 21/10/16]

³ _ Transport et logistique de France (2015), Chiffres clés du transport. [Online] Available at: e-tlf.com/dossiers-tlf/chiffres-cles [Accessed 21/10/16]

CONCEPT



Conditions for implementation

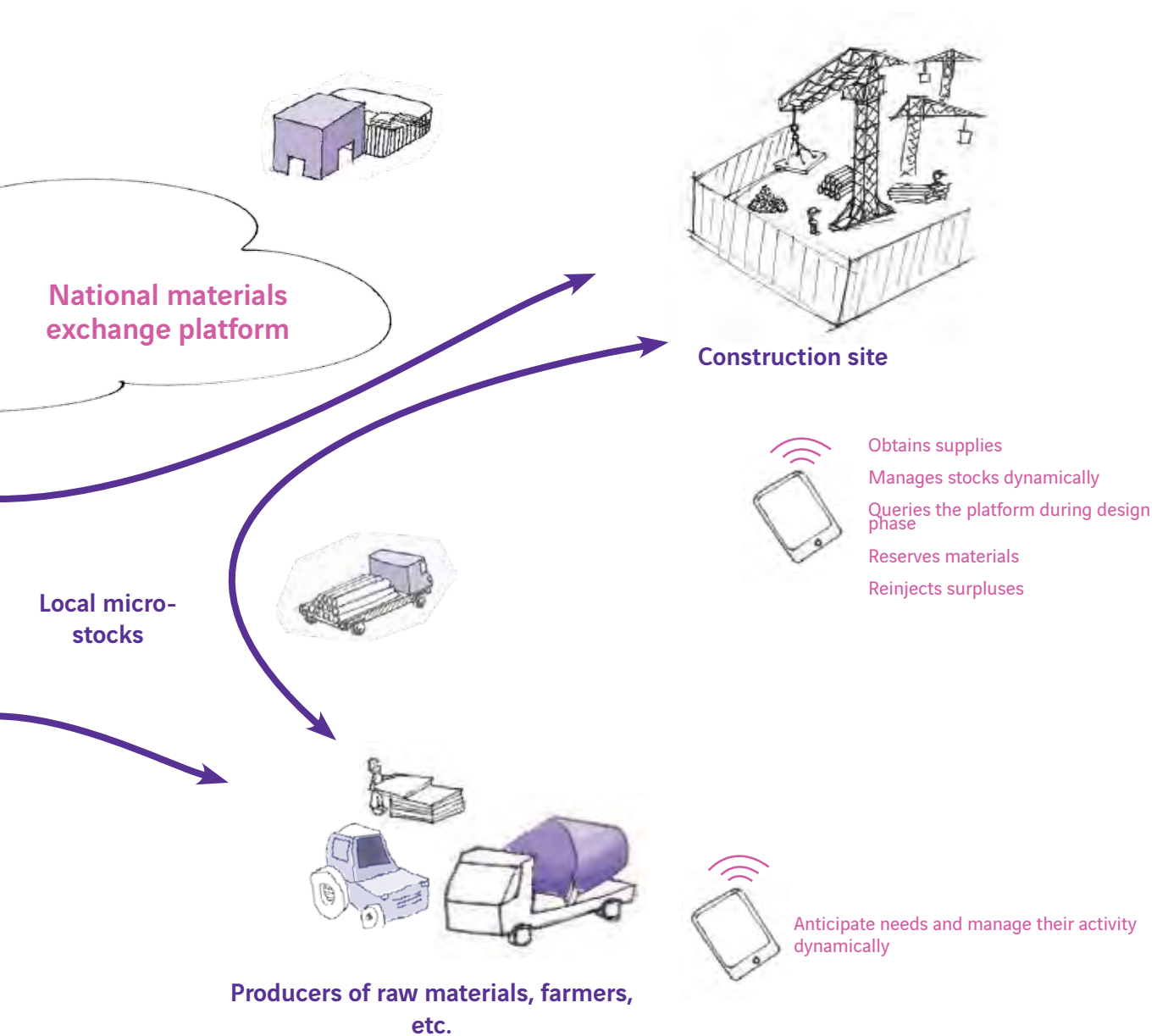
To facilitate circulation and reuse, the legal status of waste produced on worksites will need to be adapted to ensure a better distribution of opportunities and responsibilities. Having the various players in the recovery chain involved in bearing legal responsibility for the waste will encourage the development of synergies among them.

By the same token, it appears essential to first build a common knowledge base of the potential reuses of the materials, supported by certification processes.

In what way is it innovative?

Thorough knowledge of construction waste reuse opportunities fosters the creation of micro-production activities on the site itself, further shortening the recovery loop. The interface between citizens and construction players is simplified and, there again, fosters the development of very short loops.

Moreover, the combination of physical and digital platforms creates meeting points between worksites in both space and time, reducing the transportation of materials as much as possible.



Going further...

- What legal changes to waste statuses are required?
- Which players should be involved in creating and operating the interoperability platform?

EXTENDED LIFE CYCLE

Presentation

The concept of the extended product life cycle is based on the large-scale development of a channel for reusing, upcycling and recycling citizen's objects. In this way, extension of the life cycle of products reduces the amount of new products brought into the city and limits the logistical impacts associated with the product's life cycle, from the sourcing of raw materials, through delivery to the consumer, up to its end-of-life treatment.

Unlike traditional waste treatment channels based on notions of mass collection (by volume), this new channel is part of a logic of collection and recovery based on value, in order to identify and select, as early as possible in the process, durable objects so as to avoid their premature end to life. To achieve this, two collection modes are used: having people voluntarily bring in their items, or mobile selective collection. Both pre-suppose a new, third location namely the third-party shop.

Third-party shops link the territory densely, reducing the number of voluntary collection points. Selective collection is carried out by reverse logistics, and is based on existing means deployed by traditional logistics players, a mobile recycler, or an entrepreneur paid according to the market value or employed by the third-party shop.

A type of adapted recycling centre, a third-party shop can take various forms: a service corner in a shopping centre, an upcycling store, a recycling coop, a fab lab with a commercial bent, a neighbourhood multimedia centre... Some include digital production equipment (e.g. 3D printer, laser cutter). Anyhow, they all aim to connect citizens, associations, businesses, artists and makers with each other.

Third-party shops use a digital platform that fulfills several functions. It provides citizens with a veritable platform for advice or guidance with respect to the objects they would like to repair or give away. For example, the platform can facilitate the sale and collection of objects as part of a peer-to-peer transaction. Or, if an object is broken, the network can access a database of spare parts, supplied by builders, allowing third-party shops equipped with a 3D printer to fabricate in-situ the parts required for the repair.

Key figures

2000 recycling and reconditioning centres recover used objects in France.¹

9,3 million

The quantity of goods arriving at the end of their usage in France in 2012 and that could have potentially been reused or repurposed totaled 9.3 million tonnes.²

49% of French people say they buy second-hand whenever possible. Use of collaborative platforms is motivated primarily by financial savings (78%), pleasure (64%) and ideology (43%).³

¹ Youphil (2014) *Qu'est-ce qu'une recyclerie ?* [Available online at: yophil.com/fr/article/07330-recyclerie-ressourcerie-insertion-emmaus?ypcli=ano] [Accessed 20/10/16]

² Hestin, M. et al. (2014), *Panorama de la 2e vie des produits en France*. BIO Intelligence Service for ADEME, October

³ Mediaprisme (2015). *Survey conducted for 60 million consumers using a representative sample of 1,115 people*

Conditions for implementation

To catalyse short recovery loops through third-party shops, an incenting framework has to be implemented to drive behaviours promoting reusing and repurposing (taxes on domestic waste, financial bonuses for recycling...).

Similarly, supporting ecodesign and ecobuilding initiatives to extend products life cycle is necessary to delay their desuetude and eradicate planned obsolescence.

In what way is it innovative?

Waste collection logistics is completely re-imagined and benefits from neighbourhood spaces to offer the largest products panel possible.

The third-party shop concept makes reusing and repurposing items visible in the urban environment and re-establishes a direct connection with the consumers. The place would ideally link the citizens to tools, advice, and solutions to repair their items or to get rid of them in the most relevant way.

Furthermore, digital solutions allow to aggregate scattered data thanks to a simplified and automatised citizen-sourced data collection. CtoC exchanges are made possible at a large scale with third-party shops playing the role of a trusted third-party.

Finally, the development of the reuse and repurpose sectors on a larger scale based on organised local stakeholders facilitates communication with the major distributors and encourages the integration of repair requirements during the design phase of the products.

Going further...

- Who should be in charge of operating the third-party shops (public or private players, associations)?
How to manage an organisation made of heterogeneous structures with different statuses?
- What are the organisational and legal frameworks needed to implement the relevant partnerships?
- What could be the business model of this new sector and the payment model for citizens?
- What quantitative impacts can we expect on urban logistics?

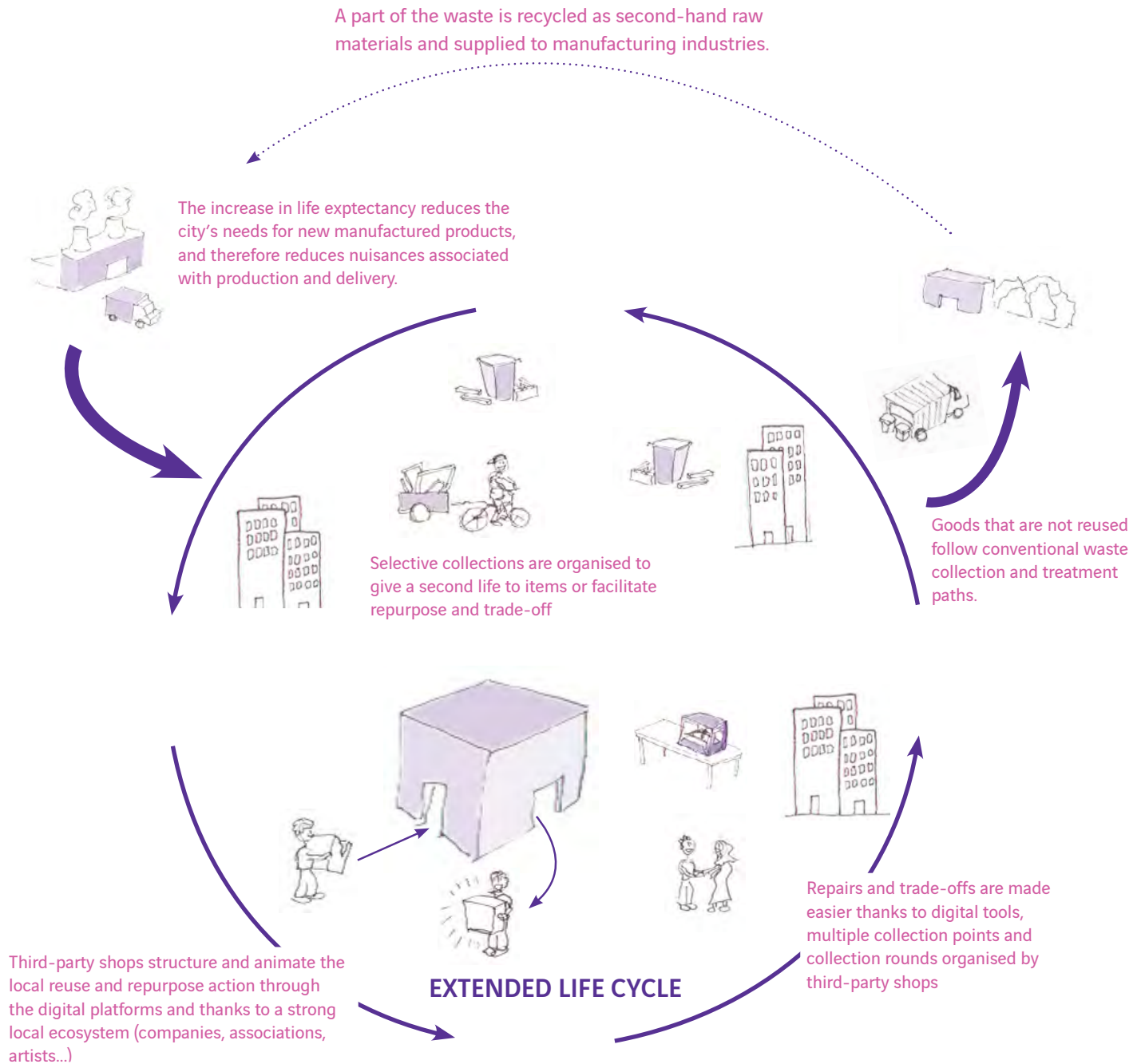
CONCEPT

A part of the waste is recycled as second-hand raw materials and supplied to manufacturing industries.

New manufactured goods are produced and delivered to the city.

Nearing the end of their life, goods follow conventional collection and treatment paths.

SHORT LIFE CYCLE







DETROIT, A (SOON) RESILIENT CITY?

Former jewel of the automotive industry, Detroit symbolises the social and economic crisis of the second age of industrialisation. Automation, delocalization and social conflicts have eclipsed the golden age of Motor City, which is today in the grip of depopulation and unemployment. However, a new way of looking at the city has emerged from this crisis. Do It Ourselves, urban farms and space reappropriation: these are the logics at work in this “ghost city” that is set to become a new post-industrial city.

The revitalisation of a “ghost city”

The heavy dependence on a single industry that has gone through a severe crisis and changed greatly has led Detroit's residents to **reorganise themselves independently to build a new society**.

After the urban exodus, we are witnessing a progressive repopulation of the city centre by suburban residents. The automotive industry crisis, absence of public transport, increase in petrol prices and real estate slump in the city centre have gradually destroyed the suburban model in Detroit and suggest the need for a new type of urban planning in cities that are being restructured. **Three times larger in surface area and ten times smaller in population than Paris**, Detroit is being reconstructed little by little around its city-centre, which has been abandoned for a long time.



Country: United States

Number of inhabitants: 706 585

Surface area: 385 km²

Density: 1 838 inhab/km²

Average congestion ratio: 12%¹

Model: a city in crisis

¹ Ratio between the immediate number of vehicles parked and the number of authorized spaces



Renamed Farmway, the 10km² Brightmoor neighbourhood, one of the areas in Detroit that was most affected by the crisis, has risen from its ashes and now has more than 40 vegetable patches.

In parallel, the development of a strong Do It Ourselves culture – taking control of production with simple methods – has enabled Detroit to be independent of industrialists who have delocalized their production. **Collaborative improvisation and consumption** have become the city's the new economic engines. As an example, for the past 25 years, the Motor City Blight Busters association has been gathering its volunteers to restore and revitalise houses or brownfields to revive the city's deserted neighbourhoods.

These movements initiated by citizens and local associations have become the drivers of change and renewal in the city. Nevertheless, economic power and political decisions still remain in the hands of the big industries. **The survival of most of these associations depends largely on donations from the Ford, General Motors and Kellogg's Foundations.**

To find out more, watch our web documentary “DIY Manifesto” on La Fabrique de la Cité's website, under the “workshop” heading:

This web documentary describes the “Do It Yourself” movement in Detroit through three urban stories that illustrate citizens' individual and collective efforts to improve their daily lives. Urban agriculture, coexistence, mobility and digital equality, among other things, are this movement's fields of action. Nora Mandray and Hélène Bienvenu show you around Motor City, which is being transformed by the will of its residents.



CITY CASE

A return to local production

A food desert, Detroit has only **38 grocery shops for 700,000 residents**. Fast-food reigns supreme in this city where fresh produce is hard to find.

Given the total absence of public policies and private investors' lack of interest, a conglomerate of civil associations emerged at the beginning of the 1990s to promote the development of urban agriculture. Today, Detroit has over **1,300 urban gardens, maintained by 16,000 residents**. Tomatoes, cucumbers, spinach, orchards; residents are diversifying crops to ensure year-round production. Not less than **150 tonnes of food produced in Detroit** fill citizens' plates each year. **\$10 a year for community gardens and \$20 for family gardens** allow the Detroit Garden Resource programme to take care of seed and plant distribution, as well as the training for urban growers.

Apple trees, nurseries and greenhouses find a home on vacant plots, and hydroponic crops appear under the roofs of the abandoned Packard factories.

The Greening of Detroit group, with 25 employees and a battalion of several hundred volunteers, is now a player on many plots: it transforms abandoned areas into green spaces, cleans the soil and manages urban farms.

« Cities have become the nerve centres of global exchange. Paradoxically, they are less and less connected to their local territory and their food production system. »

Carolyn Steel,
écrivain de Hungry City: How Food Shape Our Lives

In 2012, Michigan State University noted that the city's 44,000 vacant public plots, representing 20,000 square metres, could produce 76% of the vegetables and 42% of the fruits consumed by Detroit's residents.

Ultramodern greenhouses have also been set up in one of the MGM casino carparks at the heart of the city centre. Projects are supported by the U.S. Department of Housing and Urban Development, which given the scale of urban decay, has adopted a policy of "planned abandonment" to make the use of unoccupied plots of land legal.



Photo credit: Kate Gardiner - CC BY-NC 2.0

CITY CASE



Source : Detroit Works

An economic revival after the automotive industry?

In 60 years, Detroit's population has dwindled from 1.9 million to 700,000. The absence of public service, transport infrastructure and electricity has led to an unprecedented degradation in one of the largest American cities. The city has 150,000 empty plots and 80,000 abandoned buildings, including Central Station, the largest railway station in the world. Likewise, 23% of housing units are also vacant in Detroit. These unoccupied spaces present new development opportunities for this former world automotive capital.

The geographic position of Detroit (near the Great Lakes and Canada) is conducive to forging a special partnership for U.S.-Canada exchanges. The Gordie Howe International Bridge will connect Motor City to Windsor, Canada in 2019. Michigan's leaders want to take advantage of the 400 hectares of unused land in the southwest of Detroit to create a modern logistics centre near the airport. The idea is to create a warehouse, transportation services and shipping companies, which would encourage businesses to see Detroit as the gateway to the American Midwest and Canada. Michigan is currently scouting for funds to the tune of \$1.6 billion to complete its project. Besides, private actors are increasingly attracted by the low real estate cost in Detroit. In 2012, the Hantz Farms company invested \$400,000 to acquire 60 hectares of agricultural

land in the heart of the city. As a comparison, the same surface area would cost \$6 billion in the 8th arrondissement of Paris. Cheap real estate prices are also attracting progressively high tech companies fleeing Silicon Valley's high rents. TechTown, a start-up incubator based in a former General Motors factory, wants to use this no man's land to attract new entrepreneurs and facilitate the setting up of innovative businesses in Detroit. Since 2007, the incubator has supported more than 1,000 start-ups and raised a capital of more than \$100 million.

Key facts

- Detroit is an industrial city in crisis
- A city which is forced, out of necessity, to turn to local agricultural production and a collaborative economy
- An abandoned city, which is gradually taking advantage of its vacant spaces and attracting as many as it scares away
- A city that offers a new post-industrial model

In the 1930s, car factories constituted the largest integrated industry in the world, employing up to 100,000 people. Today, they have less than 6,000 employees.

The unused plots in Detroit add up to the surface area of a city like San Francisco.



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PUBLICATIONS

Studies

- « *Designing Cities for Health* »
by Michel Ladet (Sociovision) and Guillaume Malochet (La Fabrique de la Cité) – December 2015
- *Towards data-driven cities? Spotlight on New York, Boston, Los Angeles, Pittsburgh and Chicago*
coordinated by Guillaume Malochet and Alexandre Grassigny (La Fabrique de la Cité), with Blaise Mao and Laura Encinas (Usbek & Rica) – March 2015
- *The challenges of funding urban infrastructures*
by Frédéric Blanc-Brude, EDHEC (Risk Institute) – October 2013
- *The “Phoenix cities”*
by Anne Power (London School of Economics) – July 2013
- *What is the role of cities in the energy transition?*
par by a working group involving Dominique Bureau (Economic Council for Sustainable Development in the French Ecology Ministry), Remi Dorval (La Fabrique de la Cité), Alexandre Rojey (IFP Energies) and Claire Tutenuit (Entreprises pour Environnement), Alexandre Bouchet (E-CUBE Strategy Consultants) – August 2013
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by Jonathan Fayeton, Laure Mondange, Fanny Rahmouni, Charlotte Sabouret and Benjamin Toix (Master STU, Sciences Po Paris) – June 2013
- *Which financial mechanisms for urban railway stations?*
by Richard Abadie (PwC) – March 2013
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by Olaf Merk (OCDE) – October 2012
- *Citizens’ expectations regarding urban transformation*
by Michel Ladet (Sociovision) – September 2012

Overviews



- *One city, many timelines*
Boston seminar
June 2016



- *Understanding behavioural changes to keep transforming cities*
Berlin seminar
July 2015



- *What tools can be used to optimise the city?*
Lisbon seminar
July 2014



- *How to create value for cities?*
Stockholm seminar
July 2013



- *Building the shared city*
Amsterdam seminar
August 2012



- *Looking for legacy: for a sustainable impact of major sports infrastructure*
London seminar
January 2012



- *Should new technologies serve mobility, or vice versa?*
Nice seminar
November 2011



- *What is the place for public spaces in the city of the future?*
Barcelona seminar
May 2011



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